

The Iron Age

A Review of the Hardware and Metal Trades.

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THE SONG OF THE BELL.*

BY FRIDERICH VON SCHILLER.

Translated for *The Iron Age* by Prof. Wm. L. Faber.

In the pit, built firm and steady,
Stands the mold of seasoned clay;
All to cast the Bell is ready,
Craftsmen, be on hand to-day!
Streaming from the brow
Honest sweat must flow,
Then success attends us ever,
Heaven blessing our endeavor.

In any earnest undertaking,
The frame of mind should suit the deed;
So now, all levity forsaking,
Let cheerful words our labor speed.
Then let us view, with searching spirit,
What our slight powers may produce:
That man contempt alone can merit
Who studies not his labor's use.
For man this privilege possesses:
Endowed with faculty of thought,
He may, within his heart's recesses,
Feel all the good his hand has wrought.

Now, bring on the pine wood fuel—
Bring the driest and the best!
That the flame into the flue well
O'er the metal bath be pressed.
Boil the copper's stew!
Quick, the tin bring, too,
That the tough metallic mire
May alloy as we desire.

What in the pit our labor's power
Constructs with fire's aid, on high,
Within the belfry on the tower,
Aloud will of us testify.
'T will thrill the ear of many people;
'T will long withstand the tooth of time;
In joy, in sadness, from the steeple
'T will with the pious chorus chime.
Whatever lot the alternating
Decree of fate on man bestows,
The metal crown, reverberating,
Proclaims abroad with mighty throes.

Blisters now appear to settle,
And the fusion is complete.
Throw some potash on the metal,
Thus to regulate the heat!
And from dross quite free
Must the mixture be,
That from pure metallic tissue
Clear and full the tone may issue.

She greets, with joyous, festive pealing,
The loving parents' sacred deed,
When for the slumbering infant sealing
The vow to reverence the creed.
His future bright and dark lots, varied,
As yet within time's lap are buried;
Maternal love's sweet, tender powers
O'erwatch life's golden morning hours:
The years fly past with arrow-speed!
The boy forsakes his playmate, burning
Throughout the world at large to roam;
Till later years find him returning,
A stranger, to his childhood's home,
And beautiful, in youthful splendor,
Like some fair shape from heav'n on high,
Her cheek suffused with blushes tender,
The maiden stands before his eye.
There seizes then a nameless longing
His youthful heart; alone he strays;
Into his eyes the tears come thronging;
He sees his comrades' bold, rous' ways;
He follows blushing his shadow;
Her smile is rapture heaven-born!
The fairest flowers of the meadow
He calls, his dear one to adorn.
O tender yearning, hope immortal,
When first love's golden vision glows!
The eye sees open heaven's portal;
The heart in endless bliss o'erflows.
O, were but youthful love eternal!
That happy time forever vernal!

Brownish glazes the metal cover,
I shall now this rod dip in;
When we see it well glazed over,
Then the casting may begin.
Now I think it best
The alloy to test:
For the whole metallic mixture
Should be uniform in texture.

When the ductile, tender metal
Mixes with the hard and brittle,
Then the tone is pure and strong.
Prove, then, before you marry, whether
Heart and heart suit well together;
The dream is short, the sorrow long!
Sweetly rests the orange flower
On the snowy bridal veil,
While the merry bells the hour
For the wedding gladly hail.
But alas! life's sweetest hours
Also end life's glorious May:
With the bridal wreath and flowers
Fades the beautiful dream away.
Though passion ne'er stays,
Yet love is enduring:
The blossom decays
When fruit is maturing.
The man must be out,
With hostile life striving;

Be tolling and driving;
Be planting and reaping,
Amusing and keeping;
Be planning, maturing,
And fortune securing. [ing,
Then comes in the bountiful harvest the bless-
Filling both garner and barn; even pressing
Outward the walls; and the house is enlarged.
And indoors governs
Domestic the housewife;
The provident mother,
The family circle
Prudently ruling,
Her little ones schooling,
Restraining the boys,
And training the girls,
And stirring unceasing,
And always decreasing,
With ordering sense,
The household expense. [treasure,
She fills up the sweet-scented presses with
And whisks 'round the spindle the flax without
measure,
And stores in her closets full many a spool
Of beautiful flax and of bright, shining wool,

That means fire!
Bloody,
Ruddy
Glow is spread
Overhead:
As in fusion
Seems the cloud,
Lighting up night's sable shroud!
What confusion
Up the street!
Steaming heat
Darting, spreads the fire-sheet.
O'er the town it gains dominion,
Flying with the storm-wind's pinion.
Red hot, as a furnace blast,
Glow the air; beams fall fast;
Posts are crashing, windows creaking;
Children straying, mothers seeking;
Beasts are crying,
Mangled, dying;
All are running, fleeing, frightened:
Into day the night has brightened!
Up the line, each other chasing,
As if racing,
Fly the buckets; curving, bowing,

But man deposits in the bosom
Of earth a seed more precious still;
And fondly hopes that it may blossom
Above, exempt from earthly ill.
From the dome,
With heavy swell,
Tolls the bell
A funeral knell.
Solemnly its mourning tones are beating,
A wand'rer on the last, long journey greeting.
Alas! it is the wife, the loved one!
Alas! it is the faithful mother,
Whom the Prince of Night, ill-omened,
From the husband's arm hath summoned;
From the children's group hath torn,
Whom she in her bloom had borne,
Whom she, with a mother's zest,
Growing saw upon her breast.
Alas! this stroke at once will sever
The beautiful domestic band;
Her gentle spirit now forever
Has fled, to dwell in shadow land!
No longer will the faithful mother
At the household board preside;

Sacred love for Fatherland!
Busy hands, in ample number,
Cheerfully each other aid;
Nature's forces, waked from slumber,
Are obeying servants made.
Each one in his proper station
Liberty's protection claims;
Each is proud of his vocation,
And to excellence each aims.
Honor's won by gun and sabre;
Honor's justly due to kings;
But the dignity of labor
Still the greatest honor brings!

Peace divine!
Concord sweet!
Rest, remain
Smiling over our town!
Distant be the day of anguish
When a savage, hostile legion
Shall invade this peaceful valley!
When the welkin,
Blushing now in sunset glory,
Bright and fair,
May be glowing with the gory
Light of burning cities' glare!

Now that it has served its duty,
We proceed to break the mold;
Heart and eye may then the beauty
Of the graceful bell behold.
Strike now, strike away!
Crack the shell of clay!
For the mold the bell releases
Only when it breaks in pieces.

With prudent hand, in season proper,
The master may destroy the shell;
But woe, if e'er the boiling copper
Unbid, escape the prison cell!
Blind raging, and with horrid roaring,
Then madly bursts the metal forth,
As if the mouth of hell were pouring
Destruction o'er the smiling earth!
With crude force acting undirected,
No fair result can be expected;
Where wise laws do not man restrain,
Prosperity can never reign.
Woe, when, within the city fated,
Rebellion's spark is fanned to flame!
The people, rage-intoxicated,
Release from law and order claim.
Then is the bell's fierce clanging blended
With fearful uproar's deafening noise;
For sounds of peace alone intended,
The harsher roars her brazen voice.
Disorder's din is rising, swelling,
The quiet tradesman flies to arms;
The maddened mob, in street and dwelling,
The city fills with dread alarms.
Then women, to hyenas turning,
Familiarly with horrors play,
Tear the yet beating heart, with burning
Fury, within their hapless prey.
There's nothing sacred, nothing shielded
From violent and lawless hands;
The good has to the evil yielded,
And ev'ry vice unfettered stands.
There's danger in the lion's frowning;
'Tis death to cross the tiger's pawing;
But still, all other horrors crowning,
Is man, when blind with raging wrath!
Woe, when the gleam of Reason's torches
Is shown to the unthinking throng!
Enlightening not, it only scorches,
And leads to vice and fearful wrong.

Joy to us of God is given!
Bright, as solid golden ore,
Now the mold's asunder riven,
Sparkles the metallic core.
God our work has blest!
Body, rim and crest,
And the ornamental border,
All appear, in perfect order.

Come in, come in!
Ye craftsmen, all join in the glae!
The bell shall now be dedicated;
CONCORDIA her name shall be!
To peace and unity in adoration
May she collect the faithful congregation!

And this her mission be henceforth,
For which the fire gave her birth:
To her the destiny is given,
High over ev'ry earthly thing,
Within the vaulted blue of heaven,
A neighbor to the stars, to swing!
Her voice shall, in the upper regions,
Keep true account of works and days,
And mingle with the starry legions
In sounding the Creator's praise.
With subjects earnest and eternal,
Alone, her metal tongue shall chime;
And hourly, in the course diurnal,
Her stroke shall note the flight of time.
Herself devoid of heart or feeling,
And deaf alike to love and hate,
She yet, in joy or sorrow pealing,
Shall sympathize with human fate.
And as her powerful vibrations
Upon the breeze soon die away,
So may she teach, that men, and nations,
And earthly matters all, decay.

Now, with block and tackle's power
Raise the bell from out the ground!
Let her, on her distant tower,
Mount into the realm of sound!
Hail now! Let her swing!
Rising, let her ring!
Joy to our town revealing,
Peace proclaims her primal pealing.



And adds to the useful the dainty and pleasing,
Her work never ceasing.
And the father, in joyful tone,
From the house's far-seeing gable,
Counts his possessions one by one:
Shows the fences, broad acres dividing;
Roomy barns, rich farm produce hiding;
Shows the fields, new plant-life urging;
Shows the golden grain-wave surging.
Proudly he dares to boast:
"Firm as the starry host,
Are my possessions sure,
'Gainst adverse fate secure!"
But, with Fate's almighty powers
No eternal bond is ours;
And Misfortune strides apace.

Is the fracture tough and wiry?
Good! For casting now prepare.
But, before we run the fiery
Mass, unite in solemn prayer!
Strike away the tap!
God avert mishap!
Bright, in greenish splendor glowing,
Comes the liquid metal flowing.

A precious boon to man is flame,
When kept by him subjected, tame.
This mighty power of heav'nly birth
Aids him in every work on earth;
But fearful is this power of heaven,
When, once her bonds asunder riven,
Her own pathway she pursues,
Scourging nature in her cruise!
Woe, when freed, and onward sweeping,
Flourishing her savage brands,
Through the crowded streets she's leaping!
Naught the element withstands;
Ever in abhorrence keeping
Every work of human hands.

From the clouds,
Showers shedding,
Blessings spreading,
From the clouds, at random, rash,
Darts the flash.
Hear the clanging from the spire

Engines are their billows throwing.
Howling comes the storm, and howling,
Spreading still the fiery rain.
Rattling in the seasoned grain,
Now it seizes barn and stable,
Mounting up the wooden gable;
And Destruction, madly driven,
Overwhelming, rushes forth,
Swallows up the wealth of earth,
Paints upon the dome of heaven
Fearful glare.

In despair
Man to God's decree surrenders.
Powerless he stands, and wonders:
Sees his property consumed.
Burnt to ruins
Is the homestead.
But and owl
Darkly through the windows scowl;
Storms there howl;
Freely there now snow and rain
Access gain.

One look more
Yet bestowing
On the glowing
Ashes of his earthly store,
He accepts his fate, still knowing
There is comfort yet to cheer him,
Though his property is gone;
For he counts his dear ones near him,
And, behold! he misses none.

Now the work may be regarded
Done, for well the mold did fill.
Will our efforts be rewarded?
Will success attend our skill?
What, if chilled too fast,
Bad appear the cast!
Ah! misfortune may be near us,
While the fairest hopes yet cheer us!
To our mother Earth confiding
Our work, we wait amain.
To the earth entrusts his grain
Thus the sower, still abiding
Heaven's blessings, sun and rain.

Unloving, there will sit another
At the orphaned fireside.

Each one now may be at leisure;
While the bell is cooling, rest!
Each one may pursue his pleasure
As his taste may deem it best.
With the vesper's chime
Comes refreshment time,
Rest to weary craftsmen sending—
Masters' work is never ending.

Cheerily the weary wand'rer,
In the wilds of tangled forests,
Mends his pace at sunset hour.
Then the sheep come, frisking, bleating,
And the cattle
Come with brows so broad and patient,
Calmly lowing,
To the wonted stables going.
Heaped with grain
Rolls the wagon,
Heavy laden;
Wheatsheaves lining,
Gaily shining,
Lies the wreath;
To the dance the reapers hurry
On the heath.
Quiet reigns in street and market;
Round the taper's cheerful glimmer
Now collect the house's inmates,
And the town-gate closes, grating.
Darkness covers
All the city;

But the citizen in quiet
Hails the night,
Rests secure from mob and riot
Guarded safe by law and right.
Holy Order—bliss-bestowing
Child of Heaven, ever sowing
Seeds of peace in happy hour!
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Tore away the heathen banners,
Tought the people gentle manners,
Wove the noblest human band;

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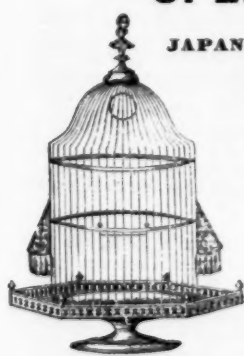
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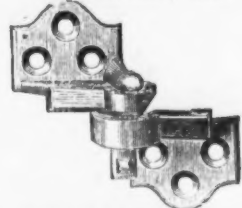
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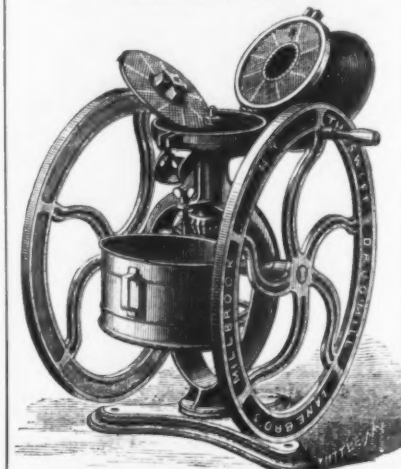
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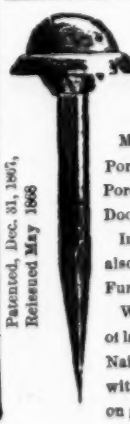
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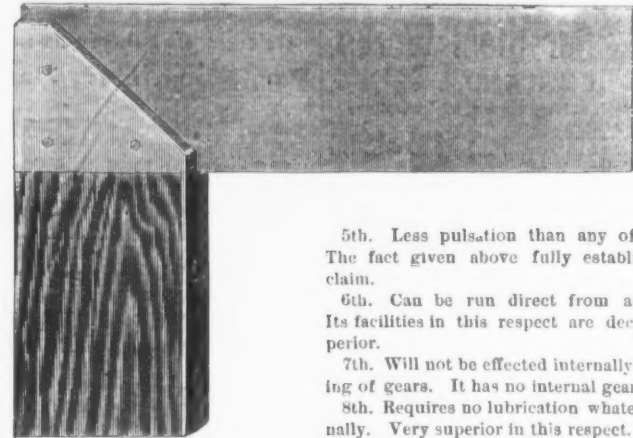
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Winterbottom's Patent Combined Try and Mitre Square.

An ingenious combination of the ordinary try square and a mitre square, it one tool, is represented in the accompanying engraving. A single glance at the construction of this improved tool will show how its use as a mitre square is equally convenient and accurate with its use as a common try square. Nothing is required of the workmen, except a change of position of the handle, by which the mitred face at the top of the handle will be brought against one edge of the work in hand, and a perfect mitre, or angle of forty-five degrees, may then be struck from either edge of the blade. A more convenient tool for all wood-workers can hardly be found. Mechanics of this class have almost constant occasion to



strike angles or mitres; and the facility with which it may be done, in connection with the use of this tool as a try square, too, will doubtless command for it a ready sale. It is manufactured by the Stanley Rule & Level Co., New Britain, Conn.

The Baker Rotary Pressure Blower.

We present herewith a sectional view of Baker's Rotary Pressure Blower, a description of which we published on the first page of our issue of last week. At the recent exhibition of the Franklin Institute, held in Philadelphia, rotary pressure blowers were submitted to very careful and intelligent tests, by a committee consisting of Messrs. Wm. S. Cooper, L. S. Cheney and C. Chabot, who have submitted the following report:

The sub-committee appointed by you to test the merits of the Root Blowing Machine and the Baker Blowing Machine, attended to that duty, and we believe that all parties were satisfied with the thorough and fair test to which both were subjected. We took the capacity of the two machines from the printed circulars of each respectively, the Root Blower being rated to discharge 13 1/2 cubic feet per revolution, and the Baker Blower 12 cubic feet per revolution. The instrument to test the speed of the machines was applied four times to each during the test. The Root Machine was speeded to

indicated by the gauge was 11 1/4 on the average, standing part of the time at 12 oz., and sometimes falling as low as 10 oz., the pulsation, as before, being so great as to make the needle invisible; the power consumed being 8.43 horse-power.

Your committee also carefully examined each machine relative to the points as claimed by the Baker machine, a copy of which is herewith submitted, and have decided as follows, on each claim separately:

1st. Strength. We see no difference.
2d. Durability. We feel justified in saying that the Baker machine is so constructed that time will prove it eminently entitled to first place on this claim.
3d. Fewness of parts. Allowed.
4th. Ease of motion. This is proved by the amount of power consumed.

5th. Less pulsation than any of its class. The fact given above fully establishes this claim.

6th. Can be run direct from an engine. Its facilities in this respect are decidedly superior.

7th. Will not be effected internally by wearing of gears. It has no internal gears.

8th. Requires no lubrication whatever internally. Very superior in this respect.

9th. It requires no dubbing to make it temporary tight. Very superior in this respect.

10th. Will exhaust, as well as blow. We did not test this.

11th. Dust will not injure it. It certainly cannot.

12th. Dampness will not change its form. It certainly cannot, as it is constructed of iron and steel exclusively.

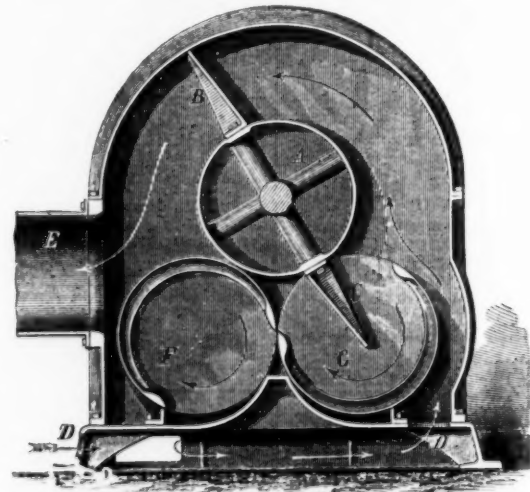
13th. It runs steady without jerking the belts. We had no means of deciding on this claim.

14th. Will blow hot or cold air equally well. Allowed; we believe this to be a very important point.

15th. It requires less power for the amount of air discharged. This is proved by the indicator cards.

16th. Its entire absence of friction internally. This claim is very decidedly sustained, while the Root Blower has, and it must be very considerable in the latter. Your committee are therefore of the opinion that the Baker Machine has proved itself the best in every respect, and entitled to the first premium and diploma.

Improvements in Telegraphy.—The tendency of improvements in telegraphy, as shown by the current business of the Patent Office, is toward cheapness and rapidity of transmitting messages. At a recent trial of an instrument which quadruples the capacity of each wire, 302 business messages, averaging ten words each, were transmitted in ninety



THE BAKER ROTARY PRESSURE BLOWER.

180 revolutions per minute, and in order to make both machines equal in discharging through holes of equal size, it was found necessary to speed the Baker Machine up to 202 revolutions per minute, at which speed the latter machine indicated 20 oz. average on the pressure gauge, the variations being from 19 to 21 oz., and the pulsation being 6 oz.; at a speed of 180 revolutions per minute, the machine indicated 18 oz., very steady, the variations being not more than 1/2 oz. in either direction, while the pulsation was about 5 oz. The Root Blower, at a speed of 180 revolutions per minute, indicated an average of 17 oz. pressure on the gauge, and at no time reached above 18 oz., while sometimes falling as low as 15 oz. The pulsation was so great that the needle of the instrument became invisible from the rapidity of its movement. The speed of the machine was found to be uniform during the entire test. We then tested both machines, run by the same engine, three indicator cards being taken during the test in each case, which was continued for ten minutes, with the following results: The Baker Machine was run from 3:05 o'clock to 3:15 o'clock; the counter registered during the test, 1517 revolutions; the pressure gauge indicated 13 oz., very steady, and the pulsation 5 oz., the average power consumed being 8.13 horse-power.

The Root machine was run from 4:05 o'clock until 4:15 o'clock, making, in that time, 1500 revolutions by the counter. The blast pressure

minutes, over a single wire, four operators working at each end thereof. The old instruments sent from sixty to eighty words per minute. Telegraphy is largely used for the protection of railroad trains, and has lately been applied to a system of "block signalling," whereby a train rises and lowers signals both in front and behind it. These signals are placed one mile apart, as a warning to the engineers of other trains that they must not enter the section of road on which another is traveling until the first one has passed into another section.

Statistical tables show that there are in the whole world about one hundred and sixty-four cities with 100,000 inhabitants; nine with over a million; twelve with from a million down to 500,000; twenty with from 300,000 to 400,000; thirty-three with from 200,000 to 300,000; and ninety with from 100,000 to 200,000. The aggregate of the population of these large cities comprises fifty millions of inhabitants, that is to say, the twenty-eighth part of the entire population of the globe. The average population of a town is reckoned to be: For England, 47,770 inhabitants; for France, 32,251; for Prussia, 19,685; for Sweden, 5849. The density of population in reference to area is for Paris 329 inhabitants per hectare (about two acres and a half); for London, 103; for Berlin, 59. This density varies considerably from one district to another; it is generally the highest in the poor or manufacturing districts. Next to these figures come those which represent the average density in regard to dwelling places. It is in St. Petersburg 52 inhabitants for each house; in Vienna, 49 1/4; in Paris, 32; in Berlin, 32; in London, 8.

| Iron. | Iron. | Iron. | Iron. | Iron. |
|--|---|--|--|--|
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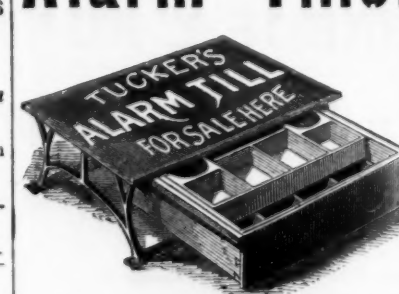
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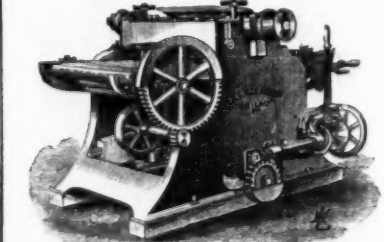
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New Patents.

We take from the records of the Patent Office
at Washington the following specification of
certain patents lately issued, which will be
found interesting:

IMPROVEMENT IN REFINING LEAD.
Specification forming part of Letters Patent
No. 156,180, dated October 20, 1874, issued to
William A. Shaw, of New York.

This invention relates to the refining of
metals by means of gases, more especially lead
by chlorine gas; and consists in more
thoroughly intermingling the metal, when in
a molten state, with the gas used, so that every
portion of the metal is brought into contact
with it to be acted on, and in readily collect-
ing and preserving the products of the chemi-
cal action of the gas on the metal, or, more
properly, on the impurities in the metal to be
refined. Instead of blowing the gas through
the melted mass of metal, as heretofore done,
shower the metal, or pass it in small streams,
through an atmosphere of the gas, and thus
more cheaply and thoroughly effect the con-
tact of all parts of the metal with the gas em-
ployed, preventing the waste of the expensive
gas. The volatile products are collected readily
in a condenser connected with the kettle in
which the metal is melted and showered.

In the drawing, a a is a cylindrical furnace,
constructed of iron, lined with fire-brick, hav-
ing a fire-box at b and an ash pit at c. The
cap of the furnace is of heavy cast iron, as
shown at g g. Into this furnace, resting and

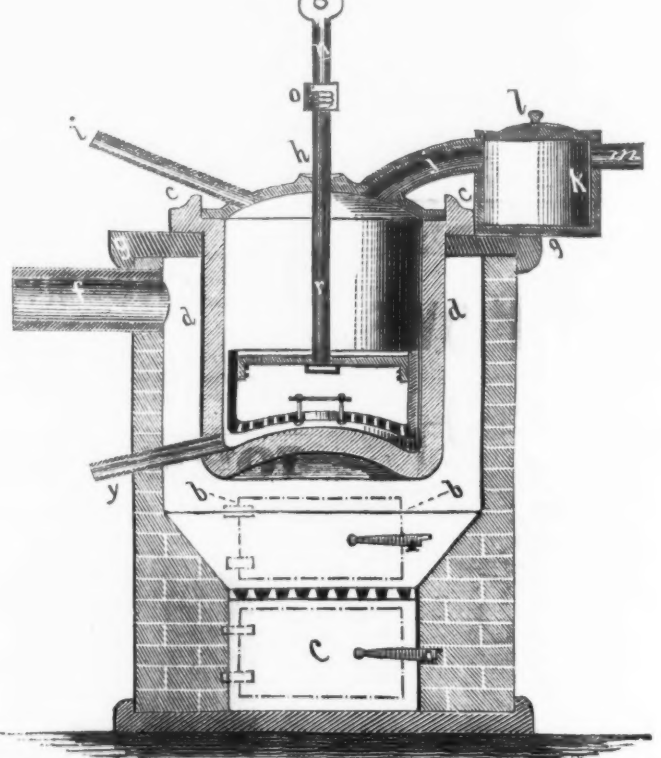
pigs. Those chlorides not volatile at the tem-
perature employed are found in the kettle,
from which they may be removed and reduced
to a metallic state by means now employed and
understood by chemists in such cases.

During the process the completion of the
operation may be judged of by testing small
quantities from time to time as the process pro-
ceeds. It depends upon the kind and quantity
of metals to be removed, and will require from
five hours to several more. Commercial lead
varies greatly in the quantity of impurities, as
well as in their kind. A small percentage of
antimony, bismuth, tin, or all together, causes
a marked difference in the physical qualities
and render it unfit for chemical purposes and
the manufacture of carbonate of lead, or what
is technically termed white lead.

For generating the chlorine gas, any well-
known process may be employed. Use lead
retorts in cast iron steam jackets, and chloride
of sodium in the proportion of four parts
mixed with three parts of black oxide of man-
ganese and seven parts of sulphuric acid dilu-
ted with seven parts of water. The gas
should be washed and dried before it is allowed
to enter the melted lead receptacle. A steam
engine and any suitable hoisting apparatus are
employed to lift the agitator and strainer.

Chlorine gas is of such a nature that it can-
not be pumped, as it corrodes all metals. By
this invention the vessel is filled with chlorine
and the metal to be purified is showered through
it, thus dispensing with the use of a pump.

Claim.—1. In the refining of lead by chlorine



IMPROVED APPARATUS FOR REFINING LEAD.

suspended on the cap g g by means of a pro-
jecting flange, shown at c, is placed an iron
kettle, d d. The bottom of the kettle is im-
mediately over the fire-box of the furnace, and
the space between it and the walls of the furnace
admits the heat all round to ascend to the
smoke pipe f. A is a lid for the kettle, which
rests within a projecting flange, so that it may
be luted gas tight with clay. Through the
center of the lid is an aperture through which
passes an iron shaft for the purpose of lifting
and lowering a strainer, which will be described
farther forward. Projecting from the lid, at
an angle of about 20°, is an iron pipe, i, for
conveying gas to the interior of the kettle.

Another similar pipe, j, projects from the op-
posite side, to carry off the volatile products re-
sulting from the action of the gas on the
melted metals. k is a condenser, made also of
iron or other suitable material. This has a lid,
l, which can be displaced in order to remove the
condensed products. m is an escape pipe.
The strainer p p consists of iron, or other suit-
able material, having a form corresponding to
the bottom of the kettle, but of less diameter,
in order that there may be space of about an
inch between its sides and the kettle. The bot-
tom is perforated with fine holes about one-
thirty-second of an inch in diameter each. At
the center is a valve, q, for admitting the melted
metal into the strainer when it is forced down-
ward, but which closes again when the strainer
is lifted, and causes the metal to flow through
the small apertures and fall below in small
streams. r is the shaft for lifting the strainer.
n is a ring and trivette for operating it. O is the
connecting socket, for convenience in discon-
necting the two sections, in order to adjust the
lid A.

In practical operation construct a kettle or
reservoir, as just described, of capacity for
holding three tons of lead to be operated upon,
and which, when melted, will occupy about
one third the height or capacity of the kettle.
The lid, strainer, and condenser having been
adjusted, pass chlorine gas through the pipe i,
which, being heavier than atmospheric air, falls
to the bottom of the reservoir and fills the
whole space and overflows through the con-
denser. The strainer or showering apparatus
is then lifted and lowered repeatedly, or as of-
ten as it will fill and empty itself. This opera-
tion not only agitates the melted metal, but, by
showering it in fine streams, causes the greatest
amount of surface to come in contact with the
chlorine gas, which converts the impurities into
chlorides—mostly volatile—which pass over
through the pipe j and condense in the chamber
k. When the operation is completed the metal
is drawn off through the pipe y and cast into

gas, the showering or agitating of the molten
metal in an atmosphere of the gas, so as to pre-
sent a large surface to be acted on by the gas.

2. The combination of a kettle and strainer
or showering apparatus.

3. The strainer p p, provided with valve
and shaft r for moving it.

4. The kettle d d, provided with pipes i, j
and y, and condenser k.

5. The combination of a suitable chlorine
apparatus, with a closed chamber with an agi-
tator and a condenser.

The *Moniteur Industriel* describes an instru-
ment, the invention of a Belgian artillery, for
determining the distance from the observer at
which a gun is discharged. It is designed for
use in action as an aid to artillerymen. This
Telemetre de Combat, as it is called, consists of
a glass tube closed at both ends and filled with
liquid, in which is a *courseur*, or traveler, con-
sisting of two metallic discs, having a diameter
somewhat less than the internal diameter of the
tube, connected together by a short metallic
rod. The tube is protected by a casing of sheet
brass, the case having a slot throughout its
entire length, through which the position of
the *courseur* may be observed. The tube being
placed in a vertical position, the *courseur* at the
upper end, the latter descends slowly and uni-
formly, passing through equal distances in
equal times. Along the slot is marked a scale
of distances graduated with reference to the
ascertained rate of motion of the *courseur* and
the known velocity of sound. The *courseur* be-
ing at zero of the scale, the telemeter is held
horizontal till the flash of the gun whose dis-
tance is to be measured is observed, and then
instantly placed in a vertical position with the
zero end uppermost till the report is heard,
when the instrument is instantly returned to
the horizontal. The number on the scale at
the point where the *courseur* stops, gives the
distance. With a certain allowance for the
temperature of the air, the velocity and direc-
tion of wind, and time occupied in manipula-
tion, the instrument is said to be sufficiently
accurate to be of service; indeed, it is claimed
that in a series of experiments the error was
only eight meters in a distance of three thou-
sand.

The largest trip hammer in the United
States has recently been completed at Nashua,
N. H., at an expense of \$75,000. The weight
of iron in the machine is about 200 tons; the
ram weight 2 tons, its striking force is about
100 tons, and four large boilers are brought
into use to furnish steam to run the 600 horse-
power engine required to operate it. The im-
mense crane, with which the iron that is beat-
manipulated is being hoisted into position, is
the largest in the country, and is rigged with
modern mechanism so nicely that two men can
easily hoist 50 tons dead weight.

W. & B. DOUGLAS,

MIDDLETOWN, CONN.

The Oldest and Most Extensive Manufacturers of

PUMPS, HYDRAULIC RAMS, GARDEN ENGINES

AND OTHER

Hydraulic Machines

IN THE

WORLD.

Awarded the GRAND MEDAL of PROGRESS at WORLDS' EXPOSITION, VIENNA, 1873, being the highest awards on Pumps, &c., also, highest medal at PARIS in 1867.

Descriptive Catalogues and Price Lists sent when requested.

BRANCH WAREHOUSES,

85 & 87 John Street, N. Y.

AND

197 Lake St., CHICAGO, ILL.



UNION MANUFACTURING COMPANY,

Manufacturers of all styles Plain and Ornamental Butts,

LOOSE PIN REVERSIBLE,

Cast Fast & Loose,

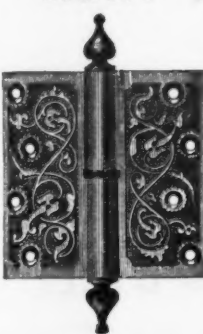
Drilled and Wire Jointed.

Japanned, Figured, Enameled, Nickel Plated, and Real Bronze Butts. A so, still line of

IRON & BRASS PUMPS, Cistern, Well, and Force Pumps, Yard, Drive Well, Garden Engine and Steam Boiler Pumps, Hydraulic Rams, etc., and all with the most modern improvements. *See Fine Castings a Specialty.*

NEW BRITAIN, CONN.

Warehouses, 99 Chambers Street, N. Y., 1 India Street, Boston, (Butts), 67 Kilby Street, Boston, (Pumps.) Send for New Illustrated Catalogue and Price List.



CHARLES E. LITTLE, 59 Fulton St., N. Y.

MECHANICS' AND MACHINIST TOOLS,

COOPERS' TOOLS & TRUSS HOOPS a specialty.

Slaters' and Coach Makers' Tools.

Merchant's Improved Solid Cast Steel Pump Auger

Dowelling Machines.

Any one in the trade not receiving my new Price List will please inform me.

C. W. BRADLEY'S EDGE TOOLS.

Butchers' Cleavers, Corn Knives, Bush Hooks, Coopers' Tools, Ship Adzes and Axes, Drawing Knives, Axes and Hatchets, Grub Hoes, Picks and Mattocks, Mill Picks, Box Chisels & Scrapers.

NATHAN WEED, 37 Chambers St., New York.



WRIGHT'S

Double Acting, BUCKET - PLUNGER STEAM PUMPS.

ALWAYS RELIABLE

VALLEY MACHINE CO., Easthampton, Mass.

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PUMP WORKS

Burlingham & Purdy,

PROPRIETORS,

Depots:

88 Camden Street, Baltimore, Md.

103 Chambers Street, New York.

Factory, Charleston, West Virginia.

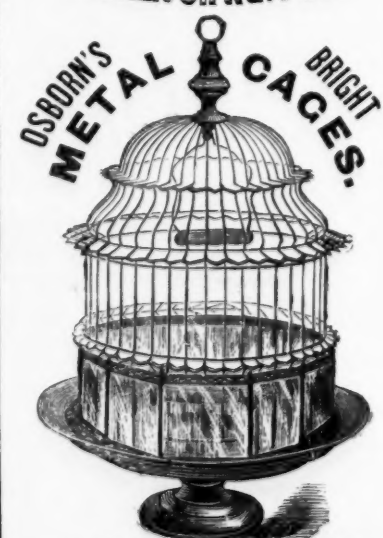
Manufacture the Genuine

CUCUMBER WOOD PUMPS.

Price List with description sent on application. See wholesale price current in this paper



OSBORN MFG. CO. 79 TRADE MARK 79 BLEEKER ST. NEW YORK.



The Original Inventors and Manufacturers of the OSBORN BRIGHT METAL CAGES.

Also OSBORN & DRAYTON improvements under twelve different patents. We are continually bringing out new and beautiful designs to meet the demands of refinement and taste.

ALVAN DRAYTON, General Agent.

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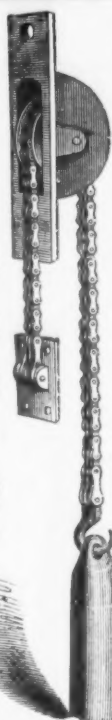
FLUTING MACHINES, Stand Sad Irons, Polishing Irons, Toilet Irons, Towel Racks, &c.

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SASH CHAIN.

Chain and Pulley for Heavy Sash. THE BEST & CHEAPEST MADE. Manufacturers of every description of Pure Bronze Metal and Hand-Plated Knobs, Hinges, &c., Agents for Gentler's Black Lead Compound. Agency and Depot of the TRENTON LOCK COMPANY.



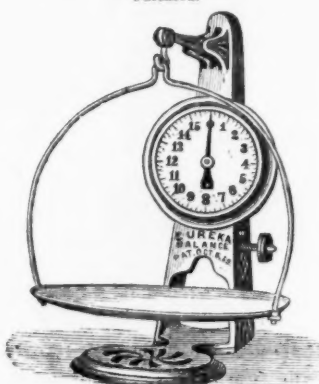
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Wholesale Manufacturer of

Coal Hods, Fire Shovels, etc. 311 Cherry St., PHILADELPHIA.

Eureka Self-adjusting SCALES.

Patented.

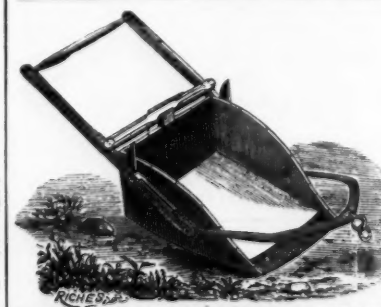


Warranted accurate and durable, having a simple attachment, by means of which a dish or any other receptacle can be balanced without the use of weights, or loss of time. This improvement cannot be found in any other scale. Manufactured only by JOHN CHATILLON & SONS, 91 & 93 CHIEF Street, N. Y.



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PAT. DEC 23.73 BLAKEMORE'S GRAVITY DOOR ALARM USE NO SPRING MANUFACTURED 3425 MARKET ST. PHILA. PA. SEND FOR CIRCULAR



REVOLVING SCRAPER COMPANY, Columbus, O.

Manufacturers of Doty's Revolving Road Scrapers, Mammoth Road Plows, and R. & C. and Canal Barrows, with Pat. Wheels. Send for Circular and Price List.

MORE THAN 7000 IN USE!!

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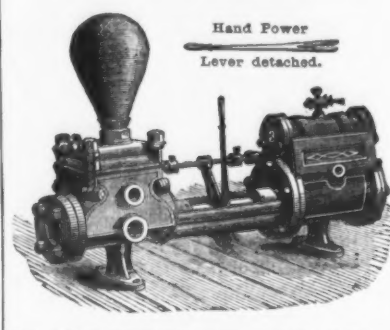
Steam Pumps.

STRONG!

COMPACT!

SIMPLE! and

DURABLE!



Cut above represents pattern of No. 3 Pump, showing Hand Power attachment, for pumping when steam is down.

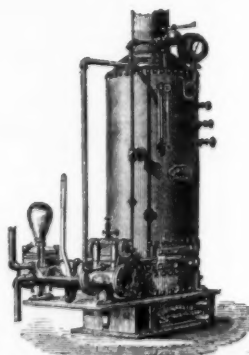
MORE THAN 7000 IN USE!

Boiler Feed Pumps, Tank or Light Service Pumps, Mining Pumps,—Piston or Plunger Pattern, Brewer's Mash and Beer Pumps, Brewer's Water and Air Pumps, Marine Circulating Pumps, Marine Bilge and Fire Pumps, Special Fire Pumps, Tannery Pumps, Marine Air Pumps, Wrecking Pumps, Oil Refinery Pumps, Oil Line Pumps, Blowing Engines, Sugar House Pumps, Vacuum Pumps—Fly Wheel Pattern, Plunger Pumps—Double Acting, Plantation Pumps, Locomotive Pumps, Hydraulic Pumps, Low Pressure Pumps, Air Pumps,—Direct Acting.

Combined Boiler & Pump,

Acid Pumps,—Of Pure Composition, Drainage and Irrigating Pumps, Gas Works Pumps, Lard or Soap Pumps, Bleachery Pumps, Vinegar Pumps, Quarry Pumps.

MORE THAN 7000 IN USE!



Cut above represents Pump and Boiler combined with fixtures complete for Railroad Water Stations, Hotels, Factories, &c.

Send for Illustrated Catalogue to

Geo. F. Blake Mfg. Co.,

79 & 81 Liberty St.,

NEW YORK.

Cor. Causeway & Friend Sts., Boston.

50 & 52 S. Canal St., Chicago.

The Union Iron Works, near Baltimore.

From a description of these works in the Baltimore Trade Review we take the following:

The foundry is 160 feet in length by 160 in width; it is thoroughly warmed, and most effectually lighted by innumerable large windows upon all sides, extending from the ceiling to the ground, thereby adding to the comfort and facilitating the workmen in their mechanical operations. In this department is a gear molding machine, by which a gear wheel can be made without the expensive form or pattern heretofore requisite for that purpose. At this time the Messrs. Poole & Hunt are manufacturing eight of these gear machines for a firm in New York, and two of them for the Allegheny Works, in Pennsylvania. In this foundry are three powerful cranes of 20 tons power, three cupolas of a capacity of 50 tons per diem, a cabinet for patterns of pulleys, improved machinery for making pulleys, the manufacture of pulleys being a specialty of this great industry. The pattern shop is 68 by 40 feet; in it is every variety of improved machinery—circular saws for cutting bevels, a hand saw of French manufacture, also cross cut and rip saws. In the melting house is a large hydraulic pump, utilized in heavy lifting, and for elevating the stock to the melting furnaces. Next is the brass foundry. In this foundry can be seen the large conical shot, weighing 180 pounds, being cast for the government, and to which are being adjusted the brass sabots, or brass caps, an invention of a gentleman in Washington. The machine shop is 450 feet long and 60 feet wide. In it are 24 turning lathes; eight planers, one of them 12 feet broad and 50 feet long—one of the largest in the country; two boring mills—one will take up to 5 feet, the other to 12 feet; ten drill presses; two bolt cutters; two pipe cutting machines; and special machinery for all and every purpose; one slotting machine; seven large cranes, and water wheel machinery. In the center is a turn table, placed at the point where the railroad tracks intersect, the one coming into the shop to bring material, the other leading from the shop, both connecting with the Northern Central Railroad. At the point where the incipient connecting track enters the premises is the large scales, upon which everything is weighed that may be intended for the establishment. In entering this machine shop, one is impressed with the grandeur and effect of a vast industrial hall, for it is replete with the most elaborately improved and effective machinery that the experience and ingenuity of a quarter of a century could procure or devise. In this long line of machinery the eye constantly falls upon evidences of the most successful adaptation of means to ends for securing the greatest economies of labor, as well as the greatest perfection in the details of the endless machinery. In the second story of this vast machine shop is the pattern storage loft, 450 by 60 feet, the counterpart of the story below in the system, order, variety and precise classification of the numberless patterns of every size, stored away for future reference in case of necessity. In the tool room is machinery for the manufacture of tools, and all tools are duplicated, and when taken out of this room to be used by the employees, must be returned or satisfactorily accounted for, or he is charged the value of the same. In this room are deposited all the templates, the pattern or form by which every piece of machinery can be made, thereby economizing time and labor, with the advantage of accuracy and interchangeability. Here is preserved, always ready for reference, the serial measurements or the Whitworth gauge; in close proximity are the grinding room, paint shop, rigging room and wash room, furnished with hot and cold water, where all the employees, after work, conveniently wash; a blacksmith shop, in which is a large steam hammer and furnaces capable of yielding ten tons of iron per diem; two blowers to furnish air for the cupolas, and a hydraulic pump, a millwright and carpenter shop. In the yard is a punching and shearing machine, a gasometer, and a few yards distant from the factory buildings is a lake which supplies the factory and town of Woodbury with water. The machinery of the entire factory, and all its appurtenances, is driven by an engine of 65 horse-power. Throughout the entire establishment, in all of its departments, will be found the most approved machinery, tools and all appliances necessary for the production of machinery and castings of the largest and heaviest character, of the best quality, both as regards material and workmanship.

The working force of the workshops is about 350 hands, and the pleasant surroundings and considerate employers serve to evoke the interest of the employees in the establishment, and to render them less desirous of change, establish contentment, and, therefore, make them more desirable and profitable to the employer. In this large establishment is constantly kept on hand an unusually large stock of miscellaneous machinery patterns, including an extensive new set of pulley, hanger and box patterns, unsurpassed anywhere, and it can present to the manufacturing public a comprehensive list, which cannot be excelled, and seldom equalled.

A dispatch from Fall River, Mass., under date of Jan. 31st, says: The trouble in the cotton mills of this city probably reached a culmination yesterday, and a disastrous and general strike seems inevitable. A conference of the manufacturers, at which a delegation of the disaffected weavers were present, was held this evening, and, after a lengthy discussion, a proposition was agreed upon virtually giving back to the operatives one-third of the ten per cent. reduction. A meeting of the weavers of the Merchants', Granite and Crescent mills was immediately held, and it was unanimously voted to refuse anything short of a restoration of their full pay. The two weeks' notice of the weavers in the two last named mills is up tonight, and of the Merchants' on Monday night. The operatives are, therefore, on a strike, which must cause the stoppage of these three mills. Much excitement exists over the matter.

Reasons for Using our Goods.

Hogs when ringed are prevented from rooting, and fatten quickly.

Pastures and clover fields are kept smooth and are not destroyed by the hogs rooting them up.

Feed lots in the winter are kept smooth, and corn that is otherwise rooted and tramped into the ground is saved.

The **Triangular Wire Ring**, manufactured only by us, is the only wire ring that can be inserted in the hog's nose with one grip on the **Ringer**, and is the only ring that will remain in a hog's nose, as it fits close, will not turn in for the joint to irritate the nose, is not liable to be torn out, and heals quickly.

No puncturing of the nose required to insert our ring.



SOMETHING NEW.

We shall this present season make a **Heavy Tinned Wire Ring** that will not rust in the hog's nose. The strongest and best ring in the market.

Prices.

| | |
|--|--------|
| Ringers, retail..... | \$1 00 |
| per doz..... | 6 00 |
| Rings per box (100) coppered wire..... | 50 |
| per doz boxes (1800)..... | 3 00 |
| per box (100) tinned wire..... | 40 |
| per doz boxes (1800) tinned wire..... | 4 00 |
| Tongs or Holders retail..... | 1 25 |
| per doz..... | 9 00 |

The coppered wire ring will be sent unless otherwise ordered.

Samples by mail postpaid on receipt of retail price.

Goods sent C. O. D. with privilege of examination before paying charges.

Net prices in quantities, circulars and posters mailed free.

Our advertisements are now inserted in over 1800 newspapers, published in every State of the Union, so that dealers will find a large demand created for our goods.

THE NICHOLSON FILE.

All *Nicholson Files* are cut with the *Patent Increment Cut*, an invention owned and controlled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of *Increment Cut File*, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand or upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

NICHOLSON FILE COMPANY,
Providence, R. I.

USE THE BEST.



Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

FILES
AND
RASPS.
XTRA QUALITY,
MADE FROM THE BEST
IMPORTED STEEL
BY THE
Auburn File Works,
AUBURN, N. Y.

JOHN ROTHERY'S
Celebrated Hand-Cut FILES,
Made of Best English Cast Steel.

WALSH, COULTER & FLAGLER, Sole Agents,
83 Chambers and 65 Reade Streets, N. Y.

W. F. SHATTUCK & CO.,

113 Chambers and 95 Reade Street, New York.

MANUFACTURERS OF AMERICAN HARDWARE.

Cross & Tuff's Pat. Wrenches, House Traps, Wire Selves, Yaw's Cow Bells, Axes, Picks and Hatchets, Axes, Pick, Sledge & Hammer, Scie Benne, Hammer, Crow bars, Hammers, Auger, Chisel & File, Patent Tap Wrenches, Tool Chests, China Horse Collars, Brandage Horse Nails, Maguire's Wrt Iron Goods, Shattuck's Platform Counter Scales, Saws, and Auger Bits, Bacon Nut Drivers.

DEAN'S New Patent (1873)
Screening Scoop

SHOVEL

For Coal, Coke and Coal Ashes, and other Substances.

The largest frames are 12 by 15 inches, with seven bars, and are made of the Best Malleable Iron. They are, or can be, wired between bars by an arrangement of holes a quarter of an inch apart, by an ordinary person, to screen any size substance desired. They are warranted to be the most durable and practical Screening Shovel made, or money refunded. Reference—All New York Gas Companies and Hotels.

Smaller sizes on hand. Please address orders to
A. SEE & SON,
N. Y. Shovel Works,
1358 Broadway, N. Y.

Price: Largest size \$50 per doz, and upwards, according to size of spaces.

Clement & Hawkes Mfg. Co.,
Manufacturers of

SHOVELS,

Planters' Hoes, Trowels and Machinery.

Northampton, Mass.

Send for Circular and Price List.

Schweitzer Mfg. Co.,
57 Reade St., N. Y.
IMPORTERS & JOBBERS.

Established 1816.
Peter A. Frasse & Co.,
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SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,
SHEFFIELD.

FILES AND HORSE RASPS,

And Importers of

STUBS' FILES, TOOLS & STEEL,
W. J. Davies' Sons' London Emery Cloth,
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EVERY FILE WARRANTED.

Equal to the
BEST.

Western Files.
Works, Beaver Falls, Pa.
Western Files.
Office, 96 Chambers St., N. Y.
Western Files.
LARGEST CAPACITY
Of any File Works in the World.
In the face of strong prejudice against American files, this brand has earned a reputation second to none. The trade in all sections testify to their excellence. We confidently offer these files as superior in every respect and cheaper than any first-class file in the market. A trial will confirm their reputation.

PENNSYLVANIA FILE WORKS.

Illustrated Catalogue and Price List
McCAFFREY & BROTHER,
Manufacturers of FIRST QUALITY FILES and RASPS ONLY,
Nos. 1732, 1734 & 1736 North Fourth St., Philadelphia, Pa.



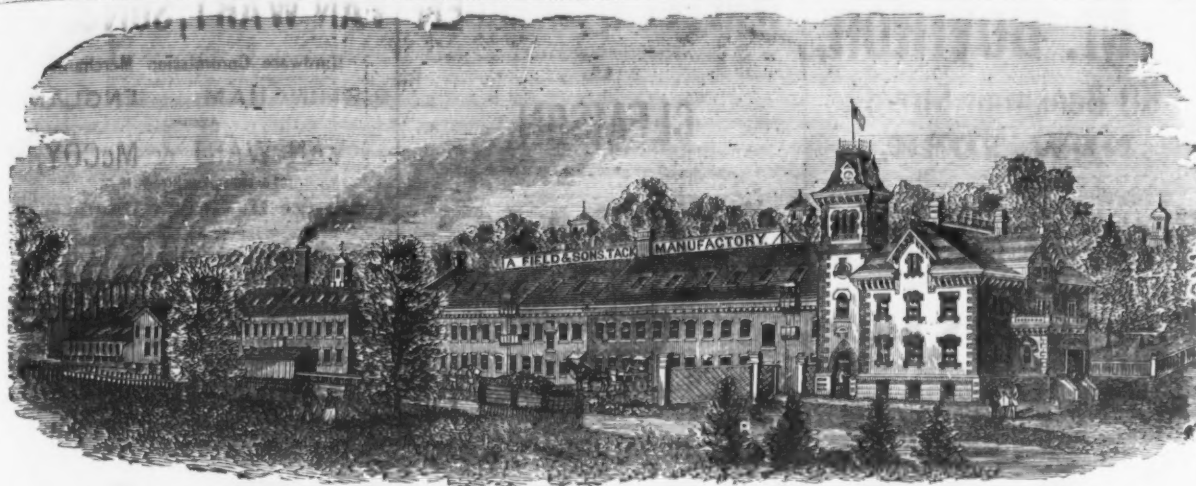
ERIE
Lawn Mower
For 1875.

PERFECTED WITH
ADJUSTABLE CUT.

Manufactured by

H. M. REED & CO.
Erie, Pa.

Send for Circulars and Price List.



A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of

Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and teal Shoe Nails, Carpet, Brush and Cimp Tacks, Common and Paten: Brads, Finishing Nails
Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Paten Copper Plated Tacks and Nails

Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks,
Glaziers' Points, etc., etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for
the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above named goods made from samples, to order.

Hopkins & Dickinson Manufacturing Co.,

FINE METAL WORKERS,

69 Duane Street, N. Y.

Works, Darlington, N. J.

Hand Made Locks and Real Bronze Hardware.

NEW AND ARTISTIC DESIGNS FOR

Private Residences, Banks, Churches and Public Buildings.

OTIS PASSENGER —AND— FREIGHT ELEVATORS

For HOTELS, OFFICE BUILDINGS, STORES,
WAREHOUSES, FACTORIES, MINES,
BLAST FURNACES, &c.

OTIS BROTHERS & CO.
SOLE MANUFACTURERS,
348 Broadway, New York.

Empire Portable Forges

NO BELTS, BELLOW OR CRANKS.
The Best Made.

Send for Catalogue to the

Empire Portable Forge Co., Troy, N. Y.

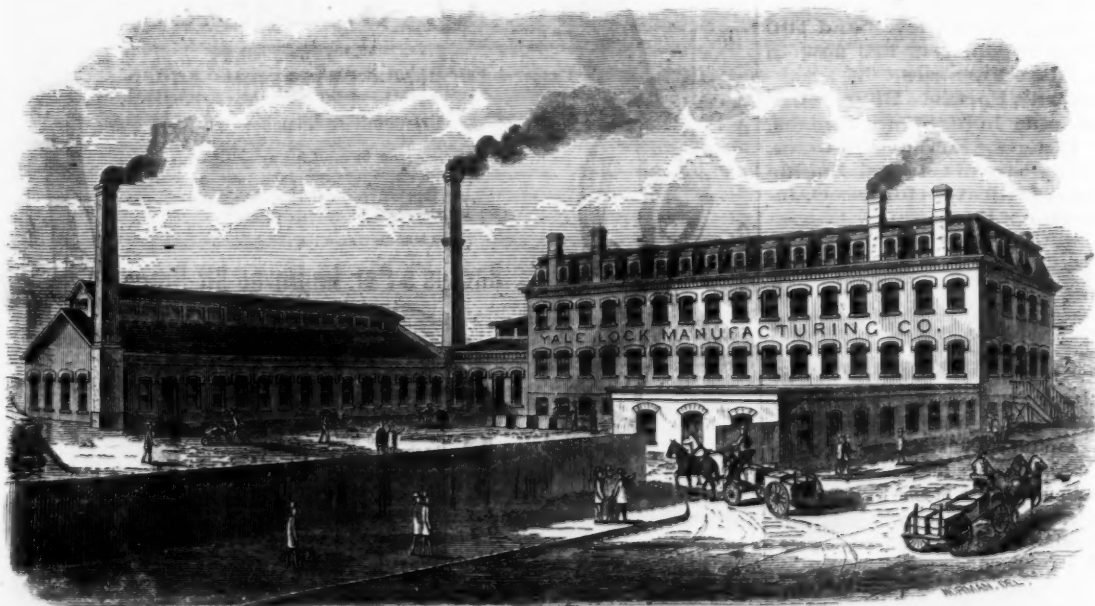
CROCKER BROTHERS, 32 Cliff Street, N. Y. METALS.

Anthracite Pig Irons,
COLD AND WARM BLAST CHARCOAL IRONS,

American and English Bessemer Irons, Iron Ores.

COPPER, TIN, &c.

Advances made on Merchandise.



WORKS OF THE YALE LOCK MFG. CO., STAMFORD, CONN.

BUSINESS ITEMS.

CONNECTICUT.

The Yale Iron Works, at New Haven, has been purchased by Mr. Wm. B. Pardee, who will continue, under the old name of Yale Iron Works, to manufacture horizontal and vertical steam engines, either for land or marine purposes. Mr. Pardee holds the right of New England to apply the Rider variable cut-off to any engine. This cut-off is becoming very popular, not only for its economy in fuel, which is equal to any other cut-off, but for its great simplicity of construction and noiseless runnings. Mr. Pardee claims that in five or more years running it will cost less, all things considered, "such as fuel, repairs and engineer," than any other cut-off engine now before the public. He will make a specialty of the patented Yale vertical engine, which is now being used in all parts of the country with the best of results. They are made of the very best of material, and finished in the finest manner, each engine being thoroughly tested before leaving the shops. A five horse engine, with all the fixtures costs \$450, and other sizes up to 50 horse-power in like proportion. Notwithstanding the hard times, these shops have been running 10 hours a day since last July.

More than forty different styles of chairs are manufactured at the works of the New Haven Folding Chair Company, at New Haven. The factories are of brick, the main building being 120x32 feet, and five stories high, with an L 100 x32 feet, of the same height. It is furnished with new machinery of the latest patterns, which is driven by a steam engine of 30 horse-power. The company employ, when running their works at full capacity, about 80 hands. Beside chairs, they manufacture folding settees, carriage wood work, &c., and give special attention to children's carriages, of which their product includes twenty varieties. One of these, the patent reversible, has gained a wide popularity. Their illustrated catalogue gives representations of the various styles of carriages, folding chairs, &c., manufactured by them. The company was organized in 1863. I. N. Dann is president and E. F. Mersick, treasurer.

Among the finest machinists' tools manufactured in the United States are those made by the New Haven Manufacturing Company, of New Haven. This company make a great variety of tools, such as lathes, planers and drills, of which they turn out large quantities, and for which they have established a high reputation. Their shops are well appointed, and fitted with new and improved machinery, which is driven by a steam engine of 60 horse-power. Their main buildings are of brick, 220 feet long, 45 feet wide, two stories in height, with an L 175x45 feet, two stories, with other buildings connected. Their works cover about three acres of ground. They give constant employment to 150 hands, and turn out a class of work second to none in the country. They have recently made very valuable improvements on some of their machinery, among which may be mentioned a planer 36 feet long 6 feet square, weighing 40 tons, with double heads and all the modern improvements; also a lathe with 40 feet bed. Their machinery is all manufactured under the personal supervision of Mr. Alex. Thayer, of the company, formerly of the firm of Thayer & Houghton, of Worcester, Mass. This is a stock company with a paid in capital of \$275,000, and have no liabilities.

The Crescent Steel Works, of Miller, Barr & Parkin, are located at Pittsburgh, on the Allegheny River, between Forty-ninth and Fiftieth streets. They were established in 1865 by the present firm, with the avowed intention of rivaling in the quality of their products the very best Sheffield steel makers. The methods of manufacture used in the famous Sheffield houses are exactly followed here, merit being claimed for careful and exact working, rather than for any quick or patent processes. In order to insure uniformity in stock the firm have their arrangements for their fine Swedish irons so made that they import direct from the makers, and have secured to themselves an entire brand of Dannemora iron, so that in certainty of supply and quality of stock they are not second to the best houses in England. The growth and reputation of the concern have been continuous. Established nine years ago with twelve melting holes, three hammers, and a capacity of three tons a day, they now have twenty-four melting holes, four Siemens furnaces, equal to ninety-six melting holes, capable of producing thirty tons a day; six steam hammers, and three trains of rolls. They are thus prepared to make twenty to thirty tons a day of all sizes and varieties of bar steel, and are making constant improvements in their appliances, to secure a beautiful and exact finish to their work. Not the least of these is the rapid adoption of gas furnaces for heating, making it very difficult for a careless workman to overheat his steel. For several years they have supplied regularly some of the best axe and edge tool makers in the country, many of the largest machine works, nail factories, screw cutters and others where steel has to do the hardest and finest work. They have driven the German rolls and English die steel out of the United States mint, so that American specie is now rolled and coined on American steel. We are informed that on account of the especial demand for their steel in Pennsylvania and the West, they had not, so-called New England trade to any considerable extent prior to the panic. During the past eighteen months, however, through their Eastern agents, Messrs. Ely & Williams, No. 1232 Market street, Philadelphia, and No. 20 Platt street, New York, they have secured the patronage of many prominent steel consumers East, and their steel is now sold by dealers in the principal cities throughout New England and New York, who pronounce it in every way satisfactory. In conclusion, we must not for-

get to say that, in addition to Swedish iron, this firm use largely of the best American charcoal hammered irons, and are engaged in careful tests of new brands, some of which promise so well that they express a confident hope of soon putting into the market an exclusively American tool steel, which shall not be excelled by the combined product of Sweden and Sheffield. Being all young men, none of them yet forty years of age, they propose to continue their studies and practice, until such a thing as preference for English steel shall be no longer known.

Wrought Iron Bridge for the Pennsylvania Railroad Company over the Delaware River at Trenton.

The Pennsylvania Railroad Company have now in course of erection a wrought iron railroad and carriage bridge over the Delaware River at Trenton, designed to replace the present timber structure.

In 1803, Wernwag erected a wooden carriage bridge on this site, consisting of five spans, two of which were 203 feet each, one of 198 feet, one of 186 feet, and one of 161 feet in the clear. It consisted of timber arch ribs, from which the roadway was suspended by iron bar chains, the ribs being formed of eight courses of 4 by 13 inches each. The arches were braced vertically by timber struts, also laterally by braces connecting the different arches together for some distance each side of the crown, and the whole bridge was covered to protect it from the weather.

This was quite a celebrated bridge in its day, and an elevation of it may be seen the *Nouveau Portefeuille de l'Ingénieur*, plate M-35-Fig. 19.

In 1845, the south side of the bridge was arranged for locomotive traffic, that part forming the present middle arch being increased in strength by four more ribs, making a total depth of 4 feet, and a new arch being erected on the south side, the bridge being kept still covered.

In 1860, the covering was taken off and four new arches were put in on the railroad portion of the bridge, along side of the old arches, which latter were still kept in position. Renewals have been made from time to time of special timbers as necessarily required it, but a large amount of timber, dating from 1803, still remains in the carriage portion of the bridge, and some in the railroad portion dating from 1848—strong evidence of the durability of timber if carefully selected and properly protected from the weather.

The design now being erected is a through bridge of three trusses, the north side being for carriage travel and the south side for two railroad tracks. It is constructed entirely of wrought iron except the piers and blocks under hinged bolsters, which are chilled castings, and the two ornamental cast fronts, the latter being merely thin castings fastened to wrought iron beneath, and not in any way contributing to the strength of the structure.

The trusses are constructed upon "Pettit's Stiffened Triangular System," with vertical and inclined members and horizontal upper and lower chords, being economical in design and at the same time after once being placed in position, requiring no future adjustment, as is necessary from time to time in all rectangular trusses of the ordinary type.

The following are the principal dimensions:
Number of spans 5
Length of spans center to center of end piers Feet.
Two spans 308
One span 204
One span 192
One span 166
Number of trusses in each span 3
Distance center of north truss to center of middle truss 25
Distance center of middle truss to center of south truss 28
Distance center of north truss to center of railing on foot-walk 6
Height from center to center of chords 26

The foot-walk and carriage way are assumed to be covered with a moving load of 75 pounds per square foot of surface, and each railroad track is taken with a rolling load of one and one-half tons per foot lineal (one ton of 2000 lbs.). The ultimate strain per square inch for tension was taken at 60,000 lbs., and for compression in short prisms at 36,000 lbs., a factor of safety of six being adopted for tension members and of four and one-half for compressive members. In addition to this, the floor beam system and certain light members of the truss were computed for a moving load of two tons per foot lineal of each track.

The upper chord consists of channel bars connected at the top by rolled plates, and is varied in section according to the maximum strains in the different parts of its length. The posts consist of channels and I beams connected together and stiffened by plates, rivets, ferrules and diagonal bracing. Some of the posts near the ends of the spans are trussed.

The main carrying members are composed of links, six inches deep, and also in some places of links and rods in combination. Those in the panels next to the center of the span are stiffened by internal diagonal bracing, so as to resist compression under variable load.

The carrying members of the secondary truss are rods. The lower chords are composed of links nine inches deep and all of varying widths. All links have upset heads and ends drilled for connecting pins. Horizontal lateral bracing is used throughout the structure in upper and lower chords, and diagonal bracing is introduced extending from the upper chord part way down the posts, allowing, however, sufficient clearance for the passage of locomotives.

Wrought iron connecting pins, four and a half to six inches, are used to connect all parts of the bridge together in both upper and lower chords. The cross girders of the railroad portion are of two channels trussed, and are placed at every panel and sub-panel. The track girders consist of two I beams under each rail, upon which are placed white oak cross ties and track stringers.

The carriage portion of the bridge has a timber flooring, and an ornamental timber screen is placed in the center truss between the carriage way and the railroad tracks.

The bolster blocks and pier plates are the "Wilson" patent, wrought iron, having hinge connections with the trusses.

The bridge has been designed and the plans prepared, and is now being erected under the direction of Joseph M. Wilson, engineer of bridges and buildings of the Pennsylvania Railroad. The manufacture and erection is being done by the Keystone Bridge Company.

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF



Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

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MANUFACTURER OF

Saws of all kinds.

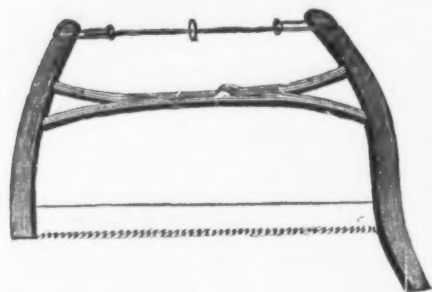
FACTORY, WILLIAMSBURG, N. Y.

Elliptic Forked Saw Frame.

Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Frame being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
Sole Proprietor & Manufacturer,
VULCAN SAW WORKS,
WILLIAMSBURG, N. Y.

**THE SILVER STEEL
DIAMOND CROSS-CUT SAW.**

\$1.50 Per Foot.

Patent Secured

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO.**, Indianapolis, Ind., who are the **SOLE MANUFACTURERS FOR THE UNITED STATES.** So confident are we that this is the best Cross-cut Saw in the market that we **CHALLENGE THE WORLD.** Orders promptly filled.
E. C. ATKINS, H. KNIPPENBERG.
Saw Manufacturers and Repairers, Indianapolis, Ind.

**J. FLINT & CO.**Manufacturers of all kinds of **SAWS AND PLASTERING TROWELS.**

ROCHESTER, N. Y.

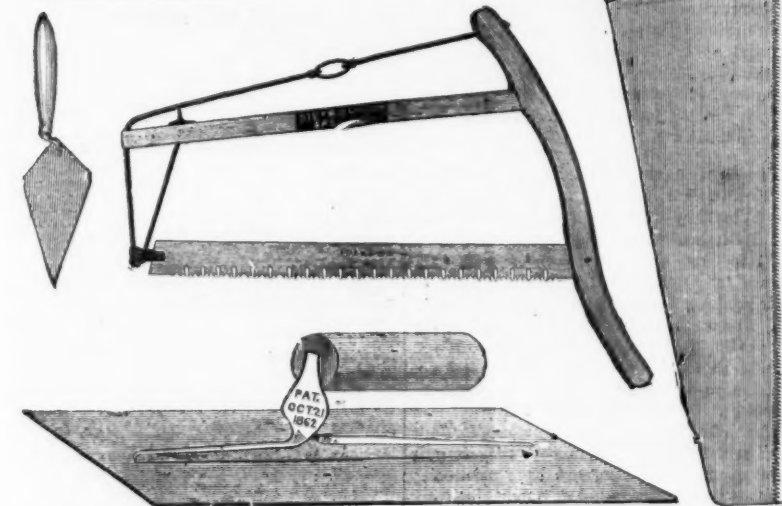
Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

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Our patent method of grinding hand saws makes them superior to any in the market.

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HARDWARE FACTORS.**

MANUFACTURERS OF:

Bonne's Hollow**AUGERS.**

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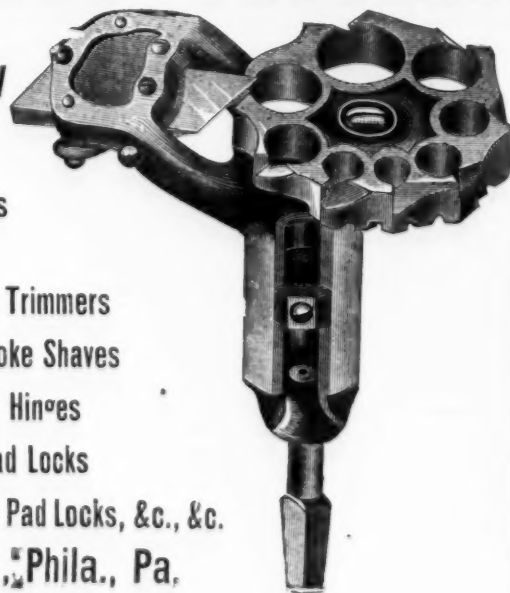
Double Edge Spoke Shaves

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Manufacturer of

Saws of all kinds.

Also Sole Manufacturer of

LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.



Note extra steel and durability over the old V, outlined on M tooth.

Telegram Dated Oct. 1st, 1874.

STATE FAIR, EASTON, PA.

To HENRY DISSTON & SONS:

Philadelphia, Pa.

I want you to publicly test that challenge on Cross Cut Saws. Name time and place within thirty days. American Institute preferred.

E. M. BOYNTON.

E. M. Boynton gave on Wednesday of last week an exhibition of what his Lightning Saw could do at the Pennsylvania State Fair, in which two men sawed through a sound oak log, 16 inches in diameter, in 17 seconds. Mr. Boynton informs us that his export trade is increasing, he having lately made large shipments of his saws to Australia and other distant markets.—*The Iron Age*, Oct. 8, 1874.

For fuller report of this exhibition see the *Eastern Morning Dispatch* of Oct. 1st, 1874.

Henry Disston & Sons cannot furnish Lightning Saws. Why do they imitate mine?

**Putnam's Government Standard
FORGED****HORSE SHOE NAILS.**Manufactured from the best of **NORWAY** Iron, and warranted to give entire satisfaction.**S. S. PUTNAM & CO.,**
NEPONSET, MASS.**PYROMETERS
for BLAST FURNACES.****E. BROWN'S STANDARD PORTABLE.****E. Brown's Improved
Gauntlet****Edw. BROWN,**

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ALSO FOR SALE

PYROMETERS

For Baker's Ovens, Boiler Flues, Galvanizing Baths, Oil Stills, Vulcanizers, Superheated Steam.

Over 300 "Gauntlet" and 100 Portable Pyrometers are now in use at Blast Furnaces.

E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.

ALSO,

**REVOLUTION
INDICATORS.**

The Revolution Indicator is driven like a governor, either from a horizontal or vertical shaft; it constantly indicates, without the use of a watch, the number of turns per minute made by a Steam Engine.

There are many engines which have to run at varying speeds for different operations, also engines controlled entirely by hand. For such, the Revolution Indicator will be found particularly useful.

Circulars on application.

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&
CLEMSON,**

Manufacturers of Warranted Cast Steel

SAWSof every description,
including

Circular, Shingle, Cross Cut,

Mill, Hand, Roberts' and

other Wood Saws,

&c., &c

Cast Steel Files

of the well known brand of

Wheeler, Madden & Clemson.

FACTORIES:

Middletown, Orange Co., N. Y.

BRANCH OFFICE:

97 Chambers Street, New York.**BRUNDAGE FORGED HORSE NAILS,**

Manufactured from

BEST NORWAY IRON,by **BRUNDAGE & CO.** Sold by**WHEELER, MADDEN & CLEMSON****Middletown, Orange Co., N. Y.**

I make a specialty of the **LARGEST SIZES** of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence: **Evenness of Temper.**—The peculiar structure of my furnace subjects all parts of the saw to a **DEAD** heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed **BALANCES PERFECTLY**, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time **TRUE**. This department is under the personal supervision of myself, who has devoted over twenty years to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "Challenge" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

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NORTH CAROLINA HANDLE CO.,

(Wilson & Shober, Props.)

Manufacturers of

AXE, PICK, GERMAN & AMERICAN**SLIDGE, and other Handles.**

Full assortment always on hand.

Backus's Patent Bit Brace

AND

Angular Extension**BORER.****Q. S. Backus,**

SOLE MANUFACTURER OF

ANGULAR EXTENSION BORER.

Salesroom, 82 Chambers St., N. Y.

This tool can be used in any brace, at any angle, and also for straight work. Is the best and most convenient tool of its kind ever offered to the public. Eight thousand sold the first year.

Also Manufactures the Straight Extension

Backus's Pat. Improved Bit Brace.**VAN WART, SON & CO.**

Hardware Commission Merchants,

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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for **John Himmer & Son's Celebrated Harness and other Needles.**

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GENERAL**Hardware Merchants,****BIRMINGHAM, - ENGLAND.**

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Dec 25, 1873; Jan. 20,

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Bright Metal

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Moulders' and Plasterers' Tools.

Manufacturers of and Dealers in all descriptions of

Moulders' and Plasterers' Tools, and Dealers in

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CARTER'S PATENT CARRIAGE LIFTING JACK, &c.

Cutlery.

John Russell Cutlery Co.,

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TABLE CUTLERY,
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IN GREAT VARIETY.

Extra Hard Rubber Handle Table Cutlery of our own Manufacture.

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Pen and Pocket Cutlery, Solid Steel Scissors, F. & L. Shears, Razors,
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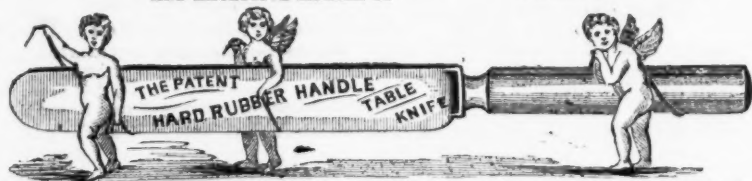
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And the "Patent Ivory" or Celluloid Knife. These Handles never get loose, are not affected by hot water, and are the most durable knives known. Always call for the Trade Mark "MERIDEN CUTLERY COMPANY" on the blade. Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers Street, New York.

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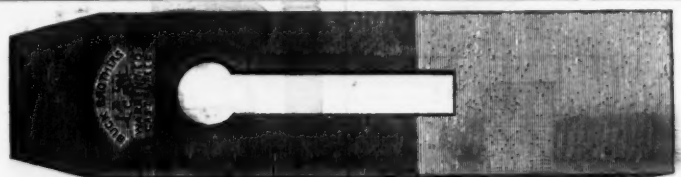
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The only knives made that are put together in such a manner that there is no strain on the covering or fall part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the Best American Knife. We also make

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The most complete assortment in the U. S. of Shank, Socket Firmer, and Socket Framing Chisels.

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Celebrated I-XL Cutlery, Razors, &c.

AGENT FOR

WALTER SPENCER & CO.,

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Corporate Mark.



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JOSEPH ELLIOT & SONS,

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GEO. WOSTENHOLM & SON,

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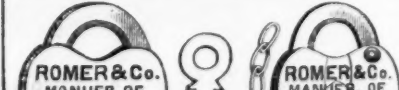
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Manufacturers of Patent Brass Pad Locks for Railroads and Switches. Also, Patent Stationary R. R. Car Door Locks. Patent Plan and Sewing Machine Locks.

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Iron and Steel Set Screws, Round, Square and Hexagon Head; Machine and Cap Screws; Piano, Knob and Lock Screws; Machine, Bridge and Roof Bolts, Bolt Ends, Blanks, Nuts, Washers, etc., of every description. Send for Price List.

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Shelton Company,

Manufacturers of every variety of

TACKS & SMALL NAILS,

Carriage, Machine, Plow, Stove and Tire Bolts, Coach Screws, Bed Screws, &c.

BIRMINGHAM, CONN.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Feb. 1, 1876.

A great obstacle to the improvement in business, which has been lately noticeable, is the horribly inclement weather which has been inflicted on us. The sleety, icy storms which have followed each other in rapid succession since New Year's Day, have placed our city streets in a dangerous condition, obstructed navigation, delayed trains on railways, and given a decided setback to all enterprises looking toward the spring trade. While this hyperborean condition lasts it is impossible to transact business or move goods with any satisfaction, and hence, for the present, we may expect comparatively little improvement. An unnecessary degree of uneasiness has been aroused in regard to the financial condition of our city and near-by iron firms, through sensational and exaggerated rumors of the failure of prominent firms. Even the generally well informed correspondent of the *Tribune*, of your city, asserts that without an improvement in the market for iron numerous failures must occur. The real cause for this scare is to be found in the temporary suspension of Mallin Brothers, iron commission merchants, of this city, and of Samuel Fulton & Co., furnace owners and pipe founders of Conshohocken and Norristown, with headquarters here. These embarrassments were not noted at their occurrence in this correspondence, because it was generally understood that an arrangement with creditors could be made and the firms go on. In the former case this has been effected, and it is said will also be in the latter. The disposition to exaggerate actual losses and invent injurious reports to the credit of manufacturers cannot be too strongly reprehended. The rumors which have been coupled with the names of some of our leading iron makers have been numerous and extravagant. In one case a manufacturer was currently reported on the street to have gone to protest, when another in the same trade announced in my hearing his willingness to sell the suspected individual to the amount of half a million on his four months' paper. Careful inquiry among both the leading manufacturers, and those who handle their paper, assures me that there is no such danger as apprehended. Some firms, who have carried their entire product for better prices, or have it under hypothecation, are pinched until they can realize, but with the actual appreciation in iron, and the really decided improvement in orders to mills, this can be but a short time. The truth is that all grades of iron are advancing, that we now find holders refusing anything under a fair profit, and that while there have been one or two failures the mass of the trade is sound, financially, as it has been all through the panic, although having suffered more severely from it than any other branch of American industry. Under such a state of affairs any withdrawal of confidence now would be both unjust and impolitic.

The important features in the local news of the week have been the report of the Senate Committee on navy yards, recommending the consolidation of several yards in one, the sale of the old city navy yard here, and the immediate completion of the League Island Navy Yard as a first-class station. At this point the old yard here, and the Washington Navy Yard, are to be consolidated. The report is strong in favor of League Island from its position, contiguity to coal and iron, natural advantage, and cheap skilled labor. The recommendation of the committee will doubtless be adopted, and the improvements to be made will furnish employment for many hands, and an active demand for iron work.

To-day the Philadelphia and Reading Railroad Company put into operation, on their Germantown and Norristown branches, the first approach to the Parliamentary trains, in use in England, yet adopted in this country. These are to be called workmen's trains, and run at hours in the morning and evening which will enable mechanics to reach their work before seven o'clock in the morning, and to return to their homes after six at night. The fares are reduced to an average of ten cents per trip for the extreme distances, in each case about eight miles, with corresponding reductions to nearer points. Workmen heretofore have not had the benefit of coupon tickets, which cannot be had in less quantities than \$5 worth at a time, and the change will be greatly to their advantage. The important portion of the change, however, is that it introduces into the United States a step toward class travel, an arrangement in railway passenger traffic always needed, and particularly in this vicinity as the Centennial approaches. The Reading Company proposes many local improvements, and in this way is deserving of the thanks of our people for them; although it does get roughly handled for its coal freights and side combinations in the coal line.

The Steel Tariff.

A meeting of the Iron and Steel Committee of the New York Board of Trade, was held on Monday last, at No. 23 Park Row. Mr. John Leng, chairman of the committee, presided. Among those present were George Sanderson, of G. Sanderson & Co.; Henry Moore, of J. & Riley Carr; Charles Huggell, of Wilson-Hawthorn & Ellison; J. M. Montgomery, of Peter A. Frasse & Co.; A. Clark and G. W. C. Clark, secretary of the Board of Trade. The letter of Hon. Fernando Wood, addressed to the merchants of New York, was attentively considered.

The merits of the "Little Tariff Bill," and the proposed new measures of Congress affecting imports were discussed. A strong expression was made in favor of appointing permanent Commissioners of Customs, who should regulate and superintend the collection of customs duties, and by uniform action avoid the vexatious and uncertain interpretation of the acts of Congress relating to imports, from which merchants now suffer. It was resolved that a copy of the report of this committee, as published, be sent to each member of Congress, and particularly to the members of the Committee on Ways and Means. Also, that a memorial to the same effect as the report be at once presented to Congress by the Board of Trade; and that a distinct protest be made against the proposed reimposition of the ten per cent. duty on imported metals, after which action the committee adjourned to meet at the call of the chairman or other proper officer.

The following are the principal points of a report made by the gentlemen whose names are appended to it, setting forth the reasons why, in the judgment of the committee, the duties imposed upon steel under the existing tariff, should be materially reduced or abolished:

If there be any insurmountable obstacles to

the total abolition of duties upon steel—which is denied—there can be no doubt that these duties should, in order to foster the interest of the consumers, be made much lower than at present, and so simple that there should be no possibility of dispute as to the rate of duty upon any parcel of steel.

The rates of duty upon and classification in our present tariff relating to steel are as follows:

Steel, in bars, ingots, sheets and coils, value seven cents or less per pound, two and one-quarter cents per pound; value seven, and over eleven cents per pound, three cents per pound; value over eleven cents per pound, three and one-half cents, and ten per cent. ad valorem. Steel railway bars, one and one-quarter cents per pound; steel in any form not otherwise provided for, 30 per cent. ad valorem; manufactures of steel not otherwise provided for, 45 per cent. ad valorem. All less 10 per cent.

The average rate of duty derived during the last five years upon importations of these various classes, exclusive of steel rails, was 24.92-1000 cents per pound.

This complex system of levying duties, based upon the value, is thoroughly unreliable for the government, and fraught with danger and excessive annoyance to the honest importer. Unreliable for the government, because it is utterly impossible for any man even to approximately appraise the value of any sample of steel, judging only from its appearance, and this is all that the Custom House Appraiser has to guide him, unless he relies upon all importers' invoices. Upon this point we beg to call your attention to the report of General Starring, the special agent of the Treasury Department, a copy of which is appended hereto.

The appraiser who is called upon to fix the value of an article, from its appearance only, which ranges in price from four and a half cents per pound to twenty-five cents per pound, and whose appearance is scarcely any guide as to its value, finds imposed upon him a duty which he is utterly unable to perform—he really has nothing to guide him except general impressions, and is frequently led, in what he considers the honest and faithful performance of his duties, to inflict serious inconvenience, hardships, expense and suspicion upon the straightforward, honest importers, and also seriously to embarrass consumers, who have to wait for their goods until decisions are arrived at by the General Appraiser. And, on the other hand, there is nothing to prevent the dishonest importer from undervaluing his goods, and thus at the same time robbing the government and obtaining an unfair advantage over his honest competitor. In order to prevent any opportunity for fraud upon the revenue or unjust suspicions against the importer, and to save him the expense and trouble he has been, and is, subject to under the present system, and to aid in the development of general manufactures and commerce, we respectfully suggest that if steel is not placed on the free list, in lieu of the present complex system of taxation, one uniform rate, not exceeding one cent per pound, be levied upon all descriptions of steel, and all manufactures of steel not otherwise provided for.

We are satisfied that such alteration would not only prevent all trouble and annoyance to honest importers and government officials, but would also prevent the possibility of fraud, and give so much impetus to general manufactures that the revenue from this source would be largely increased.

The statement provided by the Treasury Department of importations of steel and duty derived therefrom, which has been alluded to, is annexed hereto.

JOHN S. LENG,
EDWARD FRITH,
W. O. WOODFORD,
A. M. J. WATSON,
JOHN HOGAN,
HENRY MOORE,
CHARLES HUGGELL.

Steel importations from 1870 to 1874, showing amount realized from average rate of duty. The concession of 10 per cent. during years 1870, 1871 and 1872, is made for the purpose of striking a fair average and ascertaining the exact revenue per pound received. Steel in bars, ingots, sheets or wire, not less than one quarter of an inch in diameter.

| Year. | Quantity Imported, Lbs. | Amount of Duty Collected. | Average Rate of Duty. |
|-----------|-------------------------|---------------------------|-----------------------|
| 1870..... | 31,513,497 | \$737,951 | 2 31-1000. |
| 1871..... | 41,762,011 | 90 per cent. | 50 per cent. |
| 1872..... | 46,357,333 | 1,085,409 | 2 34-1000. |
| 1873..... | 42,246,494 | 90 per cent. | 90 per cent. |
| 1874..... | 27,685,159 | 1,067,682 | 2 508-10000. |
| | | 813,168 | 2 35-1000. |

Simple Test for Lubricating Oils.—A

simple method of testing for hydrocarbons or mineral oils in lubricators, is to fill a bottle with the oil in question, moistening the cork and inside of the neck of the bottle, and then twisting the cork about its longer axis. The best lubricating oils produce no sound, but the more the oil is adulterated with hydrocarbons and products of dry distillation, the louder the noise produced. An oil that gives a loud cry is most unfitted for a lubricator.

We invite attention to the advertisement of Messrs. Farist & Windsor, steel manufacturers of Windsor Locks and Bridgeport, who came from England in 1850, without means, but knowing their business thoroughly, soon succeeded in founding one establishment at Windsor Locks, considerably extended since, and later another not less important one at Bridgeport. They are constantly under heavy contracts with the leading gun manufacturers of the Eastern States, and deliver Messrs. Smith & Wesson, of Springfield, alone, 10 tons of de-carbonized gun barrel steel weekly.

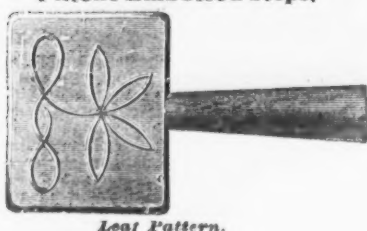
We furthermore call attention to the advertisement of Messrs. Reynolds & Co., of New Haven, manufacturers of iron and steel set screws, &c., long and favorably known in their branch of trade for articles of superior workmanship.

The Shelton Company, of Birmingham, whose advertisement will be found in another column, manufacturers of tacks and small nails, &c., is one of the oldest and most respectable concerns of that important and rapidly expanding locality, having been established nearly forty years ago, and still being managed by its venerable president, Mr. E. N. Shelton, one of the richest land-holders of Derby and suburbs. His son, partner in the firm, has had a most important invention of his patented quite recently—an improved tack paper—the manufacture of which will be conducted by a newly established house, of which he is also a partner, under the name and style of Cornell & Shelton, also of Birmingham.

We call attention to the advertisement of Mr. H. Hammond, manufacturer of cast steel hammers for carpenters &c., of a superior quality and workmanship, recently established in the suburbs of Hartford.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



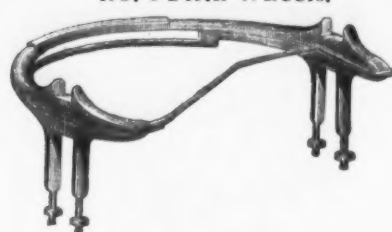
Leaf Pattern.

King Bolt Yokes.



Established 1850.

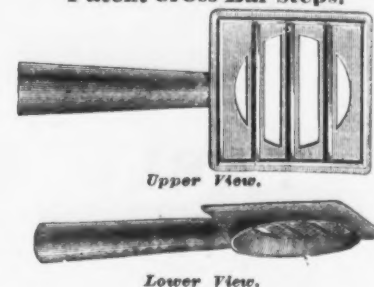
No. 6 Fifth Wheels.



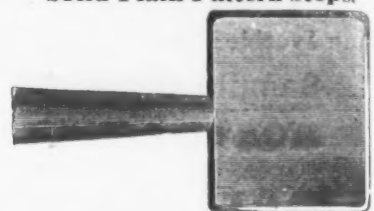
1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.



Solid Plain Pattern Steps.



Smith's Improved Philadelphia Pattern Slat Irons.



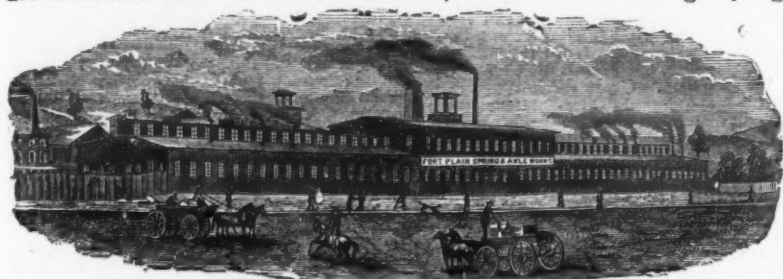
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SOLID BOX VISES.

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Jack-screws, Braces, Coffee Mills, Turning Lathes, Clamp
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House Pullies, Composition Cocks, Bench Screws, Vise Screws
Gridirons, Drill Stocks and Bows, Box Chisels, Rivets,
Sheaves, Block Pins, Composition Roller and Iron Bushings,
Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying
Pins, Marlin Spikes, Malleable Iron Castings, and Genera
Hardware.

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Carriage and Tire Bolts,
NORWAY IRON,
Button Head.



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Carriage and Tire Bolts,
CHARCOAL IRON,
Beveled Head.

QUALITY GUARANTEED.

QUALITY UNSURPASSED.

The Celebrated "STAR" Brand of Axle Clips.

Blank Bolts, Wood Screws, Square Head Bolts, Plow Bolts, &c., &c.

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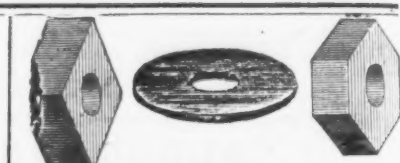
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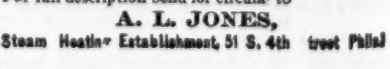
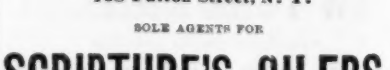
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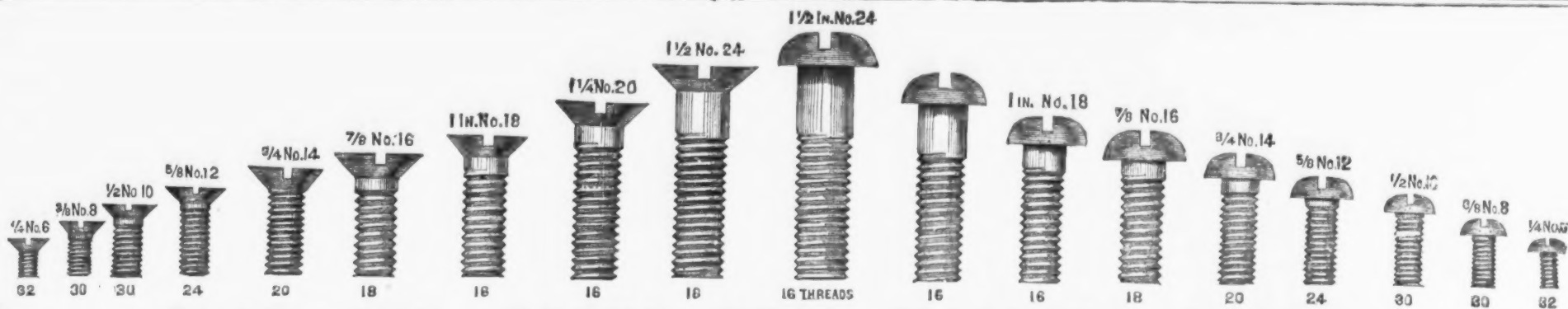
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AND LENGTHS - - 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2 INCH.

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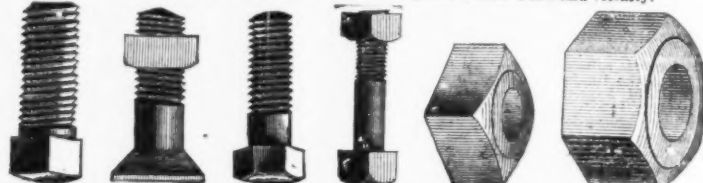
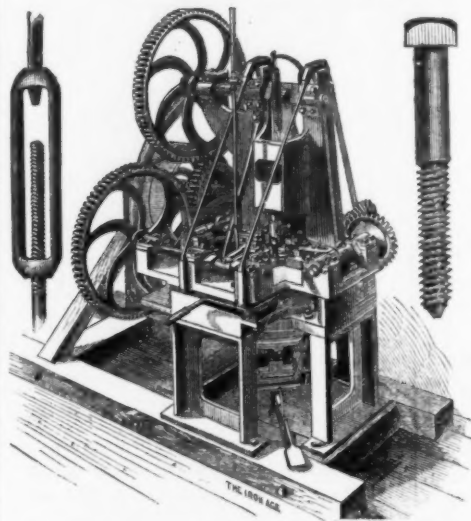
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Faugh's Patent

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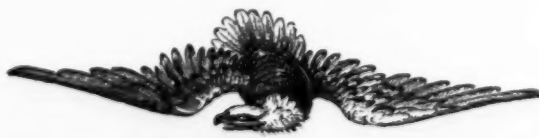
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The Iron Age.

New York, Thursday, February 4, 1875.

DAVID WILLIAMS - Publisher and Proprietor.
JAMES C. BAYLES - Editor.
JOHN S. KING - Business Manager.

New York, January 2, 1875.

Until the 1st instant the postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 40 cents; Monthly, 24 cents. Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 30 cents; Monthly, 15 cents.

Our rates of subscription will therefore be as follows:
Weekly Edition.....\$4.50 a year.
Issued every THURSDAY Morning. Contains full Trade Reports for the week, brought up to the close of business on the previous day.

Semi-Monthly Edition.....\$2.30 a year.
Issued the FIRST and THIRD THURSDAY of every month. Contains a full Review of the Trade for the previous half month.

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| To | Weekly. | Semi-Monthly. | Monthly. |
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One square (10 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00; payable in advance.

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CHARLES CHURCHILL & Co., American Merchants, 26 Wilson Street, Finsbury London, England, will receive subscriptions (all postage prepaid by us) at the following prices in sterling: Great Britain and France, 25/-; Germany, Prussia and Belgium, 33/4; Sweden, 50/-. They will also accept orders for advertisements, for which they will give prices on application.

City Subscribers will confer a favor upon the Publisher, by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hall ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

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American Car Wheels and Car Wheel Irons.

In an article in last week's issue of *The Iron Age* on the use of American car wheels on English and Continental railways, we promised our readers some interesting facts respecting American car wheel irons. These are given in an article published on another page of this issue, which will be found to merit a careful reading.

The American car wheel is one of the most remarkable products of native inventive talent. Like many other improvements, it was the result of an attempt to make something at once cheap and good. Casting wheels was a bold experiment, but owing to the remarkable excellence of the pig irons available for that purpose, it was a conspicuous success from the first. As will be seen from the records of tests in the article to which we have already called attention, our car wheel irons possess

remarkable characteristics. Soft, tough, ductile almost to malleability, they possess more of the character of wrought than of cast metal; and their ability to chill to a great depth renders it possible to give the wheels a tread as durable as the best tires now in use upon English wheels. During the past few years the manufacture of cast iron car wheels has been brought to great perfection in this country. It is a business which requires skill, experience and good judgment. To insure success in casting, the weather, the workmen, the iron, the shape and kind of wheel, the service to which it is to be employed, the molding, the chilling, all must be taken into account, as any of these causes or conditions may materially affect the result. The quantity produced is also an important factor in the calculation, as a little overcrowding of a works is pretty sure to tell upon the quality of wheels made. The chilling is in itself an operation which requires judgment and care. When certain kinds of iron touch cold iron in the mold, they chill quickly and become so hard that a file will not cut them. If the molds are not properly made the wheels are apt to warp in chilling, which makes them untrue and renders them unfit for service under passenger cars. The molding has much to do with the quality of a wheel, and only a good workman can make a mold in which a good wheel can be cast. To be good, a wheel must be essentially perfect, and the endurance of a good wheel, as compared with a poor one, is something wonderful. A poor wheel is liable to break down, or pound out, after a few hundred miles of travel; a good wheel has been known to travel more than one hundred thousand miles, and, in one instance, over two hundred thousand. When the cost and trouble of taking out old wheels and putting in new ones is taken into account, the economy of good wheels is easily seen. Their greater safety is also an important consideration, and one to which our railway managers are by no means indifferent. As the rule, only wheels of first quality are used under passenger cars in this country. Our railway managers cannot afford to use poor wheels, and they do not.

As we stated in our article of last week, this subject has great interest and importance for the managers of foreign railroads. Issues of the English technical journals received this week are filled with accounts of the terrible Shipton disaster, which shows the danger to be apprehended from the use of wheels with welded tires. The *Engineer*, especially, discusses the subject with great thoroughness, and publishes, in addition to two pages of text, a page of illustrations showing the character of the tires used by the different English railway companies. This article is so interesting that we regret our inability to give it entire, owing to the pressure of advertising upon our columns and the limited space we have been able to reserve for reading matter. We make one extract, however, which will serve to show the uncertain duration of the best welded tires.

A careful examination of the reports of government inspectors on railway accidents will, alone, be sufficient to show that some curious phenomena attend the bursting of a tire in very many cases. To say nothing of the very erratic course pursued by the fragments when they leave the wheel, we present at the outset with the fact, which has never yet received any rational explanation, that three instead of merely cracking through in one place, generally fly into a number of pieces. It is true that sometimes one fracture only occurs. In others there are two fractures, but the number and situation of the lines of breakage are apparently quite indeterminate. To illustrate our meaning, let us take Captain Tyler's last report on railway accidents in the United Kingdom. On the 1st of May, 1873, the tire of a wheel under a London and Northwestern van broke near Upton Magna. It seems that this tire broke at only one place where there was a flaw, and it failed in passing over a turned rail. Much injury was done, as the train ran off the line and down an embankment. Here we have the suggestive fact that the tire gave way in one place only, as we gather from the report, although so much is not definitely stated, that the fracture took place at a defective weld, and that it resulted from the passage of a train over a turned rail. On the 6th of January, 1873, a Leeds express on the Midland was running at its usual pace near Royston, when the near leading tire of the engine flew from the wheel in six pieces. On the 8th of the same month, on the same line, a carriage wheel tire flew off; a child's foot was injured, as the flooring was thrown up by a portion of the tire. From this we gather that the tire broke in more places than one. On the 28th of April the driving tire of a Midland engine running the Derby, Birmingham, and Bristol mail, flew from the wheel in seven pieces near Stenson Junction. On the 21st of June a carriage steel tire on the near leading wheel of an engine drawing a Midland excursion train flew off the wheel in five pieces. On the 12th of December Nottingham and Derby Midland passenger train was approaching the Spondon station, when the tire of the near leading wheel of the engine left it in six pieces. From this record, then, we find that it appears to be the rule that tires should break in several places at once; and further, that in the majority of instances the tire of a near or left-hand wheel gives way. This last circumstance may, of course, be only a coincidence, but it may be a little more, and might possibly be brought about by some peculiarity in the arrangement of the cranks and the balancing of the engine which would tend to cause oscillation toward the left to be more violent than toward the right. We shall pass this by, however, and ask ourselves how it is that these tires separated into several fragments. The fact is not without significance.

In this country the use of cast wheels with

chilled tread precludes the possibility of such accidents as those above described. There are no tires to come off, and the breakage of wheels of the class commonly used under passenger cars is of so rare occurrence that we do not now recall an instance in which loss of life was directly traceable to this cause. Wheels sometimes break under freight cars, but they are usually of inferior quality, or have been run to the limit of safety under passenger coaches. We think our English neighbors would find it profitable to adopt several of the improvements we have in general use on the railroads of this country, and especially our wheels. These we can supply in any required quantity, and at moderate cost, as compared with English wheels, until our supplies of charcoal are exhausted, of which there is no present danger.

The Pig Iron Interest.

The following appears in the *Bulletin of the Iron and Steel Association*:

At a large meeting of the pig iron manufacturers of the country, held at the rooms of the American Iron and Steel Association on the 10th of December, 1874, the form of an agreement to reduce production in 1875 was authorized to be submitted to certain pig iron makers by the secretary of the Association, and it was so submitted. The essential part of the proposed agreement was as follows:

"We, the undersigned furnace owners, in person, and by our representatives, hereby agree, each with the other, that we will severally decrease the production at our respective works to a quantity not exceeding one-half the capacity of our several furnaces, and to faithfully continue and maintain such decrease of production for and during the whole of the year 1875; provided, that this agreement shall not be binding until signed by the representatives of at least two-thirds of the furnaces, exclusive of charcoal, in the United States; and provided, further, that signers of this agreement may withdraw and be released from the same on giving two months' written notice to the secretary of the American Iron and Steel Association of their desire and intention to do so."

A sufficient time has elapsed to justify the secretary in announcing the result of the proposition above set forth. The agreement has not been signed by two-thirds, or even by one-third, of the firms to which it was submitted. Firms representing 93 stacks have written us their views of the agreement, and of these, pledges have been received from representatives of 55 stacks that the provisions of the agreement would be complied with under the conditions named. Of the 55 stacks, 31 are in Pennsylvania, 2 in New York, 2 in Maryland, 11 in Ohio, 2 in Indiana, 1 in Wisconsin, 1 in Michigan and 5 in Missouri. The agreement, therefore, falls of ratification by those whose business it was to approve or reject it, and, of course, it is not binding upon those who have signed it, and whose names it shall be our duty to guard with strict confidence.

This is as we expected it would be. We have always doubted the expediency of a combination to restrict the production or advance the price of any commodity, and have believed that an intelligent manufacturer should be guided by his own judgment in such matters, unhampered by any pledges or promises. It seems that a majority of the trade take the same view of the matter, proposing to make no promises in 1874 which would bind them to any course of policy during 1875. This does not argue an indifference on the part of the trade to the benefits which would result from a curtailment of production. On the contrary, we believe that makers are generally impressed with the importance of guarding against a heavy overstocking of the market at a time when no indications of an improvement in the consumptive demand are discernable, and when there is nothing in the condition of the iron trade on which to base a hope of material improvement during 1875. But we are not surprised to learn that a majority of furnace owners prefer to remain free to "blow in" or "blow out" their furnaces as they shall find profitable. Recommendations are better than pledges, for the former will always receive careful and intelligent consideration, while the latter are likely to be regarded with suspicion.

Now that the iron masters have decided to act in this matter of increasing or curtailing production, on the principle of every man for himself, we hope the course of the trade during the next half year will show that they have learned the lessons of recent experience. The policy to which it was sought to bind the trade in the rejected agreement, is to a very great extent compulsory upon a great majority of our furnace owners. The only conspicuous exceptions to this rule are found in the cases of certain furnaces of large capacity and superior construction, which can make iron at a cost which enables them to meet low prices without loss. Among the furnaces now out of blast there are many which we do not believe will again be profitable to their owners under any but the most exceptional circumstances. A still larger proportion can be made fairly profitable under average conditions by judicious alterations and good management. We have reached a point in the development of our iron industries from which our progress will be measured by our ability to produce iron as cheaply as it can be produced abroad. If this is done—and with our vast and varied resources of ores and coal of superior quality, it is by no means impossible—we can gradually secure for our manufactured iron a foothold in foreign

markets, and it will no longer be necessary to restrict our production to the fluctuating requirements of the home market, where consumption is liable to sudden check from many and various causes affecting unfavorably the general trade of the country: if it is not done, protection may be withdrawn in the course of the next few years, leaving us unable either to export iron or to retain our own markets in the event of such a competition from foreign iron as would now be experienced were the duty thereon repealed or materially reduced. In view of all the probabilities and possibilities of the future, we may safely conclude that our only sure dependence during the next ten years is upon cheapness. We may look forward to a long and bitter struggle in the not remote future, between the friends and opponents of protection, and as the latter seem to consider the duties on iron and steel as affording the most vulnerable point of our tariff system, we may expect that the first and most vigorous attack will be upon them. Our political history shows that changes in the tariff legislation of Congress are very nearly coincident with the alternate successes of the two great political parties which are continually striving for the control of the government, especially when the party represented by the previous majority in Congress has had control long enough to identify its legislation with its profession of principles. Everything now points to such a change at the next presidential election, and it is an unfortunate fact that protection has become so much of a political issue, that it is likely to stand or fall with the party which has claimed it as a part of its policy. It would be folly to close our eyes to the danger which already menaces the tariff system, and worse than folly to delay preparing to meet that danger until it shall come. As we said in an article on this subject in a recent issue, we think every indication warrants the belief that the history of iron making from this time on will furnish an illustration of the law which insures the survival of the fittest. The present time affords a good opportunity for a careful and intelligent study of the problem of reducing the cost of iron making until the greatest attainable economy is reached.

Trouble in the American Institute.

The resignation of Prof. C. F. Chandler from the directorship of the American Institute, on the ground that he is unwilling to continue longer in association with the gentlemen composing it, has created some excitement in the councils of that corporation. In his letter of January 23, in which he resigns from the directory, he indulges in some pretty plain talk, which will not be without good effect in stimulating the membership of the Institute to look a little more closely after its management. Prof. Chandler says:

When a year or two ago I was invited to act as a director of the Institute, under its then new organization, I accepted with alacrity, for I believed this organization capable of accomplishing an enormous amount of good, not only in encouraging the manufacturing industries of the country, but also in educating the public in everything that relates to its material welfare. From time to time complaints have reached my ears of gross injustice suffered by exhibitors, sometimes attributed to a clash of their interests with those of officers of the Institute, at other times to venality on the part of judges and others. I have hitherto been culpable in neglecting to investigate these charges, on account of other engrossing duties. In this case, however, the facts are before me; they are within my own knowledge, and I cannot permit the present case to pass unnoticed, nor can I consent to serve in an organization which deals so unjustly with those who accept its invitation to exhibit at its fair, expecting an impartial and disinterested award, according to the merits of the articles exhibited.

He then goes on to review the action of the board of directors toward an article known as metaline, which was exhibited at the late fair, and which he believes should have received the gold medal. He asserts that two influential members of the board, pecuniarily interested in a competing article, defeated the acceptance of the report of the Board of Managers recommending that it be given the medal, and concludes as follows: "I consider the 'whole affair to be a conspiracy, very 'adroitly executed, by a few of the 'aging men in the Institute, to belittle this 'rival invention, and I cannot countenance it by remaining longer a director 'of the American Institute.'"

To this letter the board of directors, through the president, Mr. Orestes Cleveland, have returned a reply, which charges Dr. Chandler with misrepresentation and conspiracy, and concludes by informing him that his resignation is unanimously accepted. So the matter stands as between Dr. Chandler and the board; as between the American Institute and the public it cannot be ended by the exchange of acrimonious and angry letters. Dr. Chandler stands high in the public esteem and confidence, which is more than can be said of the directors of the American Institute as a body; and while we cannot admire the wisdom he has displayed in so jealously championing the cause of a single exhibi-

tor, when other and equally conspicuous examples of injustice might be found upon which to base charges against the management of the Institute, his action will have a powerful influence in stimulating the efforts now making to redeem the Institute from the hands of the ring which now controls it. A committee composed of influential members, known as the American Institute Reform Committee, and representing an active and influential minority of the membership, are acting in the interest of dissatisfied exhibitors, and have sent to the Legislature a memorial asking that the management of the Institute be investigated. This will probably have the effect of defeating the effort now making to amend the charter of the Institute, by which it is sought to prolong indefinitely the terms of the present officers, and it may accomplish good in other ways. No harm will come from a full and impartial investigation of the affairs of the Institute, and if the charges made against its management are well founded, there is ample reason for immediate and complete reorganization.

The Restoration of "Burnt" Steel.

In our issue of January 14th, we published a letter from Professor R. H. Thurston, describing some experiments lately made with Schierloh's cherry-heat welding compound. Among these was the restoration of "burnt" steel, which Prof. Thurston describes as follows: "A piece of tool steel, melted and burned to a cinder-like 'scrap, was worked into a chisel, which I 'saw used, and which I subsequently tried 'myself, upon a hard cast iron. It retained 'its edge, I thought, rather better than 'the chisel which I found the workman 'using on the same lot of castings. Samples 'of the original steel, of the burned steel, 'and of the chisel, were sent to Professor 'Leeds, the chemist of the Stevens Institute 'of Technology, for analysis. The original 'steel was found by him to have lost about '30 per cent. of its carbon by the treatment 'to which it was subjected, and which resulted in the production of the so-called 'burnt' steel. Reworking this into the 'chisel just referred to, the percentage of 'carbon appears to have increased by about '10 per cent. of the original amount, a 'change which I presume to be due to the 'thorough expulsion of the oxide and 'scoria with which the second sample was 'charged. This cleansing of the impurities 'was evidently very perfectly done." In a letter subsequently sent to the editor of this journal, Prof. Thurston explains that the restored steel contained 80 per cent., and the burnt steel 70 per cent. of the carbon found by analysis in the original steel.

We now have a letter from Professor Leeds, in which we are informed that the determinations which furnished Professor Thurston the basis for his statement, did not correctly show the relation between the amount of carbon in steel before burning and after restoration. Prof. Leeds writes as follows:

STEVENS INSTITUTE OF TECHNOLOGY, HOBOKEN, N. J., Jan. 25th, 1875.
Editor of *The Iron Age*: DEAR SIR:—In your issue of the 14th inst. there is a note by Prof. Thurston on the properties of the steel which had been restored after burning by treatment with the Cherry-Heat Welding Compound of Mr. Schierloh. The following analysis, made since that time, of a steel which had been thus treated, shows that the steel which has lost its homogeneity and afterward regained it, possesses, in its restored condition, essentially the same chemical constitution as in its original condition, and hence its excellent qualities as steel are not at variance with what we know as to the proper composition of good steel. The analysis gave for the original steel, 0.605 per cent. of carbon; for the burnt, 0.563; for the restored steel, 0.579 per cent. The apparent diminution in percentage of carbon in the burnt specimen is rather, we think, to be attributed to the presence of oxide and scoria, than to a diminution of the absolute amount present, and when these foreign bodies have been removed by treatment with the welding compound, the restoration of the carbon is more apparent than real. It has been present in every stage of treatment, and the amount of carbon in the restored steel is practically the same as in the original steel.

Very respectfully,
ALBERT R. LEEDS.
This agrees with the views we have always held respecting the burning of steel—namely, that steel cannot be robbed of its carbon by the action of heat. Steel burned until it resembles a mass of cinder can always be restored by melting and recasting, and the Cherry-Heat Welding Compound accomplishes the same result by restoring to steel the homogeneity it has lost by oxidation. This restored, it is possible to work out the scoria and other foreign substances present in burnt steel by hammering. When the burning has resulted only in destroying the tempering qualities of steel, or in rendering it brittle when hot, the restoration of its original physical properties can be effected, as we have seen, without hammering, by coating it with the compound and bringing it to a white heat. This we have seen done repeatedly, and our only explanation of the phenomenon is that the heat does the work of restoring the homogeneity of the steel, while the compound, acting as a flux, protects the metal against the oxidizing influence of the flame.

As announced in the call printed elsewhere, the annual meeting of the American Iron and Steel Association will be held on Thursday, February 11th instant, at 11 o'clock, a. m. The meeting will be in the rooms of the Association, No. 265 South Fourth street, Philadelphia. An interesting and important session is expected.

The National Association of Stove Manufacturers will meet at the Palmer House, Chicago, on Wednesday the 10th instant. In view of the importance to the trade of matters which will come before the meeting for discussion, a large attendance is expected.

William Leonhard Faber.

On the first page of this issue we republish, by request of many lovers of poetry and friends of the late Prof. W. L. Faber, a translation of Schiller's "Song of the Bell," made by that gentleman for *The Iron Age* some years ago. This is as nearly as possible a literal translation, and preserves the spirit of the original more perfectly than any English version of this beautiful poem yet given to the public. We also take this opportunity to offer a brief tribute to the memory of our friend and former contributor, Prof. Faber. We regret that our limited space does not permit us to use more fully the materials for a biographical sketch kindly furnished us by his family.

William L. Faber was the only son of Conrad W. Faber, a well known merchant of this city, and for many years Consul of Hesse-Electorate at this port. His rudimentary education was acquired at St. Paul's College, Flushing, L. I. His studies were continued at a Gymnasium in Hanover, Germany, where he learned the German language. This was followed by a collegiate course in this country, after which he returned to Germany and studied for several years at the Universities of Marburg, Göttingen, Gießen, Berlin, and at the mining schools of Clausthal and Freiberg. His education had included courses in philosophy, ethics, belles-lettres, chemistry, mining and metallurgy. His instructors were Bunsen, Liebig, Wöhler, Plattner, Kerll and others, and among his fellow students were Tyndall, Frankland, and other young men who have since attained great eminence in science, and who found in Faber a congenial friend and industrious collaborator in scientific research. Intending to follow metallurgy as a profession, he concluded his studies by a tour of inspection among the metallurgical works of Europe, and returned to the United States. His first engagement was in connection with the development of copper mines in New Jersey, but he was too much of a genius to be successful as a man of business, and he found it impossible to devote himself to the drudgery of his profession by which wealth is acquired. He was always undertaking and accomplishing work of great value to others, but reaped none of the profits for himself. During this time he made many important improvements and discoveries which would have made a more practical man rich, but he gave the results of his labors to the world, and others patented what he had found out.

His next venture was in journalism, for which he manifested exceptional talent. At the outbreak of the war he joined the Southern army, and rose rapidly in rank; but domestic bereavements preyed upon his mind and he retired from the service. After the war he traveled in the West, prospecting successfully for metals. During this time he contributed to *The Iron Age* many valuable papers, including an interesting series on the metallurgy of copper, tin, lead, zinc and antimony. Just as he was beginning to see his way clear to the attainment of wealth, he was stricken with pneumonia, brought on by the exposures encountered in the mining districts, and died in Salt Lake City, in November, 1873, at the age of 43 years.

Personally Prof. Faber was a most agreeable gentleman, with many noble qualities of mind and heart. We remember with pleasure our acquaintance with him, and profoundly regret its abrupt and untimely termination.

Annual Meeting of the American Iron and Steel Association.

We have received the following from the secretary of the American Iron and Steel Association:

Office of the
AMERICAN IRON AND STEEL ASSOCIATION,
No. 265 South Fourth Street,
PHILADELPHIA, Jan. 30, 1875.

The annual meeting of the American Iron and Steel Association will be held at the office of the Association, No. 265 South Fourth Street, Philadelphia, on Thursday, February 11, 1875, at 11 o'clock, a. m.

Iron and steel makers who desire to become members of the association are invited to be present.

It is expected that the proceedings will possess more than usual interest, as subjects of importance will be considered.

SAMUEL J. REEVES, President.
JAMES M. SWANK, Secretary.

The New York Central and Hudson River Railroad Company and the Harlem Railroad Company have reduced the wages of the track forces ten per cent. This will place the wages of the employees below the Harlem bridge at \$1.25, and those beyond that point at \$1.12½ per day. A reduction will also be made in the number of men employed in this capacity. Heretofore they have been employed in gangs of seven, which will now consist of five men. They are only employed regularly six days in the week. Whenever their services are required on Sundays or during the night, they are paid at half rates. The switchmen are trembling in anticipation of a further reduction of their wages, which have been reduced from \$60 to \$52 per month. They have not, however, been notified that the reduction will take place, excepting the rumor that the rate of wages would be reduced in all departments of the road.

The Mechanical Properties of American Car Wheel Irons.

Mr. W. E. Partridge, who is at present engaged in compiling and editing a dictionary of technical terms used in car building for the Master Car Builders' Association, has lately conducted a series of experiments, with one of Professor R. H. Thurston's autographic testing machines, upon American car wheel irons. The subject of car wheels, their mileage, breakage, &c., has been extensively discussed by the association, and the car wheel manufacturers have taken a great deal of interest in the matter, not only contributing specimens of iron to be tested, but many of them have been present at the meetings in person, and given a great deal of information upon the subject.

The brands of iron from which American car wheels are made have had for many years a reputation almost world wide. These irons are, many of them, the same as those used by the government for its cast guns, and as gun metals have shown a very high tensile strength, the properties of the same irons, when made up into car wheels, are equally remarkable, though not, perhaps, as well known. In general, a car wheel in service is characterized by a very soft and tough center, while the "tread" (the part bearing on the rail) is chilled so hard that a tool will not touch it. Their endurance is also very remarkable, the general average of mileage on passenger and engine wheels being between 50,000 and 60,000 miles, according to the diameters, while in the freight service there are cases where they have run above 252,000 miles.

The metals from which these wheels are made had often been tested in the pig, but we believe that car wheels themselves had never received any accurate determination of their qualities. To do this was exceedingly important, and the presence of the testing machine at the rooms, together with the fact that the subject of wheels was under discussion, made the opportunity an unusually favorable one, and Mr. Partridge has pursued the investigation with patience and care. As we have been accorded the privilege of examining the records of the tests, we find in them much that will interest our readers.

We should hardly be correct in saying that car wheels had not been tested at all, for foundry managers are in the habit of testing their wheels by striking with a sledge—the wheel that bears the greatest number of blows with the sledge being, of course, the strongest wheel. As might be supposed, this very crude method would hardly give an accurate measure of the resistance of the wheel, and where different men were engaged in striking the element of individual strength enters as a factor into the result of the test. Now and then makers of wheels had their irons tested for the tensile strength, but, as we have said, there was nothing of a definite nature bearing upon car wheel iron after it had been manufactured. One of the first samples tested at the rooms was a well-known gun iron, such as is usually used in car wheel mixtures. The tensile strength ran up to 39,000 pounds per square inch, a surprising figure, and was for the moment scarcely credited. The next sample tested, however, went still higher before breaking, reaching 46,000 pounds per square inch. Neither Prof. Thurston nor Mr. Partridge could at first credit these figures, as there was scarcely a record at hand in which they had been reached, and but one in which they had been exceeded by a cast metal which showed any ductility. The limits of elasticity, as indicated by the strain diagrams, was also very high, 24,000 and 30,000 pounds per square inch. Below we give a table of the metals tested in this lot, which were peculiarly interesting:

| Mark. | Limit of Elasticity. | Ultimate Strength. | Maximum Elongation. | Equivalent Extension of Section. | Resilience. |
|------------|----------------------|--------------------|---------------------|----------------------------------|-------------|
| P. S. | 20,000 | 31,300 | 0.0033 | 0.998 | 64.06 |
| P. R. | 24,000 | 36,800 | 0.0017 | 0.998 | 41.71 |
| C. I. | 20,000 | 20,000 | 0.0009 | 0.999 | 12.00 |
| 0. | 9,600 | 23,000 | 0.0015 | 0.998 | 28.90 |
| 1. | 10,400 | 14,400 | 0.0055 | 0.994 | 62.40 |
| 2. | 10,400 | 15,300 | 0.0040 | 0.996 | 40.53 |
| 3. | 10,400 | 16,800 | 0.0038 | 0.996 | 41.44 |

The samples marked P. S. and P. R. were two well known brands of American charcoal irons, P. S. being a No. 3 pig, and P. R. a No. 4 pig. The tensile strain of the specimen P. R. (No. 4 pig) was very high indeed. At some subsequent tests, mixtures of these irons in equal proportions showed less strength but a very remarkable degree of ductility.

The next sample, C. I., was from a mixture of one-half Scotch pig and one-half good anthracite iron. The ultimate strength amounts to only 20,200 pounds per square inch. It was scarcely possible to say whether a limit of elasticity was exhibited by the diagram, which consisted of a straight line rising without a curve to the point of greatest strain, and then snapping after a small twist, the strain falling at once after passing the maximum. This mixture would be comparatively worthless for car wheels, being altogether too brittle. Specimen 0 was an ordinary mixed car wheel iron from a small testing cupola. This piece exhibits very plainly the fact that the small cupolas do not produce as fine a quality of metal as the larger ones, and that no furnace can produce the best results in car wheels when crowded to its utmost.

Nos. 1, 2 and 3 were all from the same mixture of one-half each of P. S. and P. R. They were samples from 12 tons of molten iron at different stages of casting. Taken from the bottom (No. 1), middle (No. 2), and top (No. 3), of the reservoir. These three were placed in the hubs of the wheels, went into the annealing pits and remained in the hubs during the process of annealing. They probably lost some of their strength from being annealed more than was necessary, owing to their small size.

In appearance the strain diagrams of these three pieces strongly resemble those of wrought iron, only smaller in extent. The line rises rapidly up to the elastic limit, showing great stiffness. It then turns off suddenly, rising but slowly, but showing great ductility, the torsional angle rapidly increasing without a great increase of the resistance. The final parting of the metal does not take place until after the greatest tensile strain has been reached, and the line has commenced to droop, a still further resemblance to wrought irons. The ultimate resistance does not rise very high, but the great ductility and comparatively high elastic limit makes the resilience of the pieces very great, being respectively 62.40, 40.53 and 41.44; showing that these irons, if strong enough to bear their load, would be on account of their ductility most admirably adapted to the work to which they are put, exceeding greatly in value the stronger but less ductile metals. One of the specimens sustained a twist of 21°, another 16°, and the last about the same. These figures are very large compared with sample C. I., Scotch pig and anthracite, which had received only a twist of 8° at the moment of rupture.

The next table gives results obtained from testing a lot of samples made direct from new wheels. They were furnished by the superintendent of one of our largest railway car shops. He selected a number of new wheels at random from the stock at the shop, had them broken up and test pieces made from the metal at the hubs. These were quite as remarkable as those previously mentioned, and in some respects even more so. They were certainly more satisfactory, as the metal had received the proper treatment. It is, in fact, precisely that which it would have received had it been going into actual service:

TESTS OF SAMPLES OF CAST IRON TAKEN FROM THE HUBS OF WHEELS.

| No. | Limit of Elasticity. | Ultimate Strength. | Maximum Elongation. | Angle of Torsion. | Resilience. |
|----------|----------------------|--------------------|---------------------|-------------------|-------------|
| 1. | 14,400 | 26,400 | 0.0018 | 11° | 32.00 |
| 2. | 11,200 | 20,200 | 0.0017 | 10° 30' | 22.40 |
| 4. | 11,200 | 20,200 | 0.0054 | 15° | 43.6 |
| 5. | 13,200 | 25,600 | 0.0078 | 30° | 128 |
| 6. | 9,600 | 18,400 | 0.0016 | 16° 30' | 20 |
| 10. | 9,600 | 26,000 | 0.0016 | 30° | 24 |

The character of these metals seems most extraordinary. When the test piece marked No. 5 in the last table was put into the machine, both Mr. Partridge and the man who was applying the power were for the moment under the impression that it was wrought iron, the diagram displaying in very many respects the characteristics of wrought iron. A well defined limit of elasticity appeared at 13,000 or 14,000 pounds per square inch, and then the pencil moved off along a tolerably horizontal line, very much as a good piece of well worked wrought metal would do. Reaching a maximum of nearly 26,000 pounds, it gradually fell to about 23,000, when the piece snapped off after having twisted through about 29°, which gives an elongation of the most stretched fiber of about one and two-tenths per cent., a most extraordinary amount for a cast metal. This gives a resilience of 128, or more. The ductility of this specimen was its remarkable feature, which would enable it to stand the severest usage without breaking. The high limit of elasticity also made it capable of withstanding a great deal of tensile strain without injury. The chill which this metal took was also good. On a piece taken from the tread of the wheel, it was found that the depth ranged from half an inch up to three-quarters of an inch. Mr. Partridge is now making an effort to get more samples of this same wheel, and others from the same iron, in order to compare results.

Next to this we notice the sample numbered 4, which is interesting because of the great resilience, 43.6, standing next to No. 5. This specimen, though it displayed no very great strength, 20,200 pounds, was very ductile, and, like No. 5, showed a plainly marked limit of elasticity. Its ductility would enable it to stand hard usage even better than stronger but more brittle irons. The chills averaged about one-half an inch in depth. We should note here that in addition to the test pieces a section from the tread of the wheel, including the flange, was taken out and numbered to correspond with the test pieces from the hub. These are now at the Association rooms, so that a most favorable opportunity is obtained for judging, both from the strain diagrams and the appearance of the metal, as to its quality. No. 4 shows evidence that the metal drew down under the action of the sledge as it was being broken up. This forging out cold under the sledge is also very plainly shown in the large specimens of No. 6. No. 1 developed the highest tensile strength, showing great stiffness in the machine, though twisting through only 11°. It could hardly be said that the diagram showed an elastic limit, yet one seemed to be indicated at about 18,000 pounds per square inch. It is a fine piece of metal. The chill is very regular, about five-eighths of an inch or over in depth. Its resilience is 40, showing that it is capable of a good degree of resistance.

A set of samples were sent to Mr. Partridge a short time ago, for the express purpose, it afterward transpired, of testing the accuracy of the machine, and determining whether it could be relied upon to give certain particulars of structure likely to escape any but the most experienced eye. The table below gives some of the principal points of the test:

| Mark. | Limit of elasticity. | Ultimate strength. | Angle of Torsion. |
|-------|----------------------|--------------------|-------------------|
| S. T. | 12,000 | 27,500 | 13° |
| H. T. | 14,400 | 34,000 | 13° |
| S. B. | none | 30,800 | 9° 30' |
| H. M. | 14,400 12,000 | 23,300 | 11° |

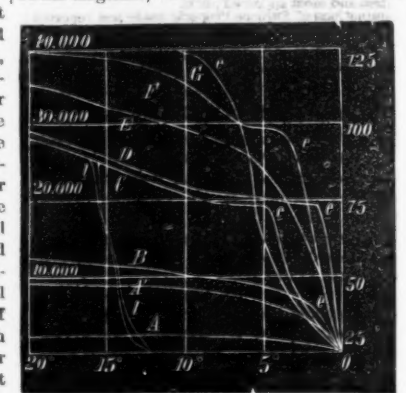
Both of the first two showed a certain openness of the grain or slight want of homogene-

ousness, but had considerable ductility, and perhaps the average strength of car wheel iron, and, while very stiff, had a limit of elasticity very well defined upon the strain diagram. In the last two there was considerably less strength. In S. B. no limit of elasticity could be shown with certainty, and in H. M. it was hardly to be recognized with definiteness.

Both the latter pieces were homogeneous, showing great regularity in their curves. They would be classed as somewhat brittle, much more so than the others. The stiffness of S. T. was greatest, S. B. least.

On submitting the report, the gentleman to whom it was sent said that the samples were from two bars two feet long, cast on end. They were both of good car wheel iron. One was soft iron and marked S, the other hard iron and marked H. S. T. was taken from the top of the bar cast from the soft metal; S. B. was from the bottom of the same bar; H. T. was the top of the hard bar, and H. M. from the middle of the same bar. When cast, the bars were at once knocked out of the sand and allowed to cool without annealing. This explained the character of the metals, and showed why they differed so much in character. Those pieces from the top, as would be expected, showed an open grain and higher strength than those from the middle and bottom, which probably were somewhat annealed in their cooling (?). The hard metal was the better of the two. These samples, when compared with Nos. 1, 2 and 3 of the first table, give us a very clear insight into the effect which annealing in the wheel pits has upon the metal of the wheels. While their tensile strength is decidedly reduced, their resilience, or capacity to withstand blows, is largely increased, by reason of the gain in ductility which follows annealing. In mechanical effect it seems somewhat analogous to the malleablizing process practiced upon the gray irons. These irons, according to Prof. Thurston, have, in some instances, shown a tensile strength of 60,000 pounds per square inch, but snapping in the machine like glass, and showing utter worthlessness for ordinary purposes. After being annealed there was a reduction in tensile strength, but they became as ductile as wrought iron, and, for many purposes, equally serviceable. Steels at times show a similar phenomenon.

The accompanying illustration shows several strain diagrams, which illustrate the character



of the metals from the top and bottom of castings. O represents the point at which the diagram starts. The line C very fairly represents the appearance of the line formed by the metal from the top of the casting. As soon as the metal has passed its limit of elasticity—the first decided change of direction at e—the line becomes convex toward the base line, showing that the grain of the metal must be open, or wanting in uniformity. The lower part of the line, though not showing positive concavity, by which internal strain would be indicated, approached very near it. The lines E and B show very nearly the appearance of the diagrams from the bottom and middle pieces. These were perfectly rounded and uniformly concave toward the base line, showing the grain to be uniform, and that there were no traces of internal strain.

All the best American wheels are made from charcoal irons. Some anthracite irons will chill, but the superiority of the so-called gun metal, or wheel iron, is so well recognized that no other irons are used in the manufacture of first-class wheels. The grading of these irons is peculiar, and confined exclusively to them. The pig iron is numbered from 1 to 6. No. 1 is very soft; No. 2 is soft, but not quite as soft as No. 1; No. 3, medium, chills to the depth of quarter of an inch; No. 4 is hard, and chills half an inch deep; No. 4½ is still harder, showing streaks of mottled, and chilling three-quarters of an inch deep; No. 5 is gray and white or mottled; No. 6 is pure white. The two last would probably chill all the way through. The carbon varies in its proportion in each of these grades. They are all made direct from the ore, and the difference in the grade is caused by different workings of the blast furnace under different treatments. The softer grades have been most perfectly melted, while the higher grades, or harder irons, are produced by carrying a greater burden of ore to the amount of coal used. Nos. 3, 4 and 4½ are the grades best adapted for the car wheel manufacture.

Though not extensively used in the general manufactures of the country, yet for a vast amount of special work these irons are almost indispensable. Mowing machine makers use them largely, the small, light castings which they employ requiring the utmost strength with the least possible weight. This iron is also largely used for the knife guards, and probably nothing better could be found. Hammer castings and other work of a similar character that must be strong and light, are made from it. In making heavy shears, these irons are largely used, as well as in castings for heavy punching machines. Scarcely anything better can be used for locomotive cylinders and saddles, which are, as a rule, made from this iron. Where roads look out for the best of work, the driving

wheel centers are also made from wheel iron. Throughout the country wheel iron is used wherever castings of great strength are needed. Some of the best firms in the country are large purchasers of old wheels to work up into hydraulic cylinders, presses, boring mills and, in fact, all large or thick castings requiring great strength. Owing to the hardness of the metal, old wheels do not answer so well for small castings, and for these the softer grades are used; but for massive work old wheels are most admirable. Certain brands of old wheels are much sought after by some steel makers, and an excellent brand of steel is made from them.

The price of old wheels usually runs about five dollars per ton higher than the ordinary forge irons. This excess of price is brought about by the arrangements between the wheel makers and rail road companies.

The stock of old wheels in the country at the present time is, probably, about 60,000 tons. In usual states of rail road business, the companies wish wheel makers to take one old wheel in exchange for every new one. But in these times the stock increases, as companies are not building to any extent, and are taking out more than they are putting in. This practice of selling old wheels to wheel makers has led some to attempt to remelt old wheels for the manufacture of new. A small quantity of old metal can be introduced into a wheel, but the wheel cannot, by any process, be made as good as from new iron, and when old iron is used in wheels the quality is deteriorated and a first-class article cannot be produced.

The testimony of wheel makers, car builders, and all experts, is unanimous on this point. One maker, at a recent meeting of the Master Car Builders' Association, said on this subject "Nearly all wheels are supposed to be made of charcoal iron. If these wheels, when used a second time, were remelted with charcoal, they would not, I think, deteriorate, but as anthracite coal is generally used in remelting, and as this contains more or less sulphur, the iron becomes more or less impregnated with it, and the quality is impaired in proportion."

Another gentleman suggested that the rail-road companies should dispose of the wheels to rolling mills instead of to the wheel founders.

The use of car wheel iron in either rails or bars, is not attended with any increased expense other than that of breaking up the wheels. Of course the greater price of the wheels over that of ordinary pig metal makes the cost of the product greater, but to a rail-road company there would be this gain—if wheels are sold at a high price to wheel makers, a deteriorated product results, while, if sold to rail makers or rolling mills, an improved result is secured.

In regard to the value of wheel iron in the heads of rails, one of the leading iron masters of the country expresses the opinion that they are of the highest value. Estimating that the life of a rail extends up to the point where 50 per cent. fail, figures in possession of this gentleman show that the average life of a rail, with a wheel iron head, is about 5.9 years or 70.8 months, while the life of the common rail was only from 27½ months to 29 months. In some remarks made regarding certain rails, and their manufacture, he says: "The kind of iron employed, and the method of manufacture, were varied somewhat in the different years; the figures show that the earlier rails in which car wheel iron was used were the best."

In speaking of another lot which had been carefully inspected, and the records of wear, etc., obtained, the following remarks were made in reviewing a table of the results: "The rails made from car wheel iron appear to have been better than these made in later years from anthracite iron, and this indicates that the quality of iron is an important element, even if the fracture of the metal appears equally good."

At the close of the war one of our Eastern firms purchased from the government a large quantity of disabled and condemned cast iron guns, at a very low figure. These guns were considered practically worthless, because they were so tough that they could not be broken up without an enormous expense. One party tried the experiment of cutting them up in a lathe, and found the metal cost as much as new pig, others tried gunpowder with equally poor success. Guns were, consequently, somewhat of a drug in the market. The firm of which we speak built furnaces by which they could melt a gun down bodily and so saved the expense of breaking them up. They have since that time been largely engaged in making castings of all descriptions in which great strength is required, and have had, as we understand, a large trade in such castings, which is constantly increasing as the value of the metal becomes known. This metal, though from the same ores and furnaces as the wheel irons, differs in having been melted in an air furnace a number of times till its maximum strength has been reached. All these metals, whether wheel or gun iron, are nearly equal to the commoner sorts of bar iron in their resistance to tensile strain, though of course their power of resisting shock is much less.

The question may arise whether the exceptionally high figures, above given, are to be relied upon as perfectly exact, and whether there have been a sufficient number of samples tested of each kind to make the figures accurate. As comparisons between the metals, there can be no doubt of their accuracy, as each specimen was tested under precisely similar conditions, a point of much importance. Facts connected with the different lots of metal from which the samples were taken, lead us to think that the figures are fair averages. For example, one of the test pieces came from a lot of pig metal which was broken up in the foundry yard with the greatest difficulty, as the superintendent expressed it, "the lot broke the back of every striker in the yard." In other cases the appearance of the wheels, and the bars from which test pieces came, confirm unmistakably the testimony of the machine.

Incidents of the British Trade in 1874.—The London Times, noticing a selection from the trade reports for last year, says, that Britain enjoys a titular sovereignty in the commercial realm, and London is the great treasury of the world. Next to gold comes Colonial wool. In woolen goods there has been a steady depreciation for years, telling on the total value of the exports as far as regards woolen cloth, blankets and yarn. Chemicals come next. Though England is now producing more than ever, and selling at lower prices, the export increases. It has not been a good year, we are told, for freight, except from the Eastern rice ports and for guano. In iron and coal, half the gain in prices has been lost at home; production has been checked, perhaps, and the restoration of our exports to the scale of a few years back, depends on the question whether Americans and England's neighbors can compete with her at comparatively low prices as well as they have done at the exceedingly high prices lately prevailing. The demand for hides has been great and the supply not adequate, and the result has been to enhance prices abroad. Respecting tin, a large number of mines are working at a loss, and many without profit. Americans, it is said, are getting the currents their little folks ought to have, because the duty still makes a difference in their favor. Rice has suffered the ups and downs of an Indian famine. Indigo is a strong and sure article, as it always has been; silk, on the contrary, the weakest, frailest, and least to be depended on. Lastly comes tallow. Its rivals multiply, but so do its consumers. Light is the universal cry of the world, and tallow is its chief and most convenient material.

Special Notices.

To Manufacturers of Agricultural Implements.

We can furnish at very moderate cost, machines for threading bolts that will give you perfect work at a fourth the cost of poor work.

Patent adjustable dies cut 16,000 bolts without varying from exact size of the tap. Fine taps and dies a specialty. The Lightning Screw Plate.

WILEY & RUSSELL MFG. CO.,
Screw Cutting Machinery Tools,
Greenfield, Mass.

Wanted,

By a young man who has had three years' experience in a Wholesale and Retail Hardware Store, and has traveled one year, a permanent situation as traveling salesman for a manufacturing Hardware or Cutlery Co. Present engagement expires April 1. First-class reference given. Address
Box 1234, Brockton, Mass.

Wanted.

A party or parties who have a few thousand dollars, to take an interest in and operate a cutlery factory, of moderate size, not far from New York. Is now owned by a company that does not run it. Would lease or take an interest in rent. Favorable terms would be made for co-operation. For particulars address
James B. Havenport,
71 Wall Street, N. Y.

Wanted, Situation.

By a steady, reliable young married man, of 24. Has had some eight years' experience in the general Hardware business, Saws and Machinery, and willing to work and make himself generally useful in any position, city or country. Reference unexceptionable. Address
Salem,
121 Elm St., Newark, N. J.

Wanted.

A young man (18 to 25) experienced in city retail House-Furnishing Goods and Hardware. To the right man a permanent position is offered. State age, experience, salary and references. Address, for one week,
"Merchant,"
Box 3836, N. Y. P. O.

JAMES AIKMAN & CO.,
25 CLIFF ST., NEW YORK, Feb. 3d, 1875.
Mr. D. W. James, Jr.,
Has an interest in our business from
January 1st, 1875.
James, Aikman & Co.

A business man, with twenty years' experience, wishes to connect himself with a well established wholesale house or manufacturing interest where his capital and services would meet a fair return. Iron, metals &c. preferred.

Address,
C. B.,
P. O. Box 3256, New York.

Partner Wanted in a Large Machine Shop and Foundry.

A rare chance for purchasing a part of or whole half interest in the oldest engineering, mechanical and manufacturing establishment in the South.

The shops are the largest south of the Ohio river, and situated in one of the rapidly increasing towns of Tennessee, and in the midst of the coal, iron and mining districts, fully equipped with the latest improved and most valuable machinery, largely stocked, running full time, with a good business established. Cash capital required, \$30,000 to \$40,000.

Address, in first instance,
W. C.,
Office of *The Iron Age*, 10 Warren St., N. Y.

NEW BUSINESS.

A firm with facilities and extended trade connections desires to manufacture new articles, staple hardware preferred, of wood or iron. Drop for details a specialty. Address, with full particulars,
H. B. Bower,
Greenfield, Mass.

Wanted,

A situation as bookkeeper or cashier of an iron works, a hardware business, or in the coal trade, which the advertiser understands in all its branches. Highest references of character, capacity, &c.

Address,
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Office of *The Iron Age*, 10 Warren St., N. Y.

Special Notices.

THE Fletcherville Blast Furnace Co.,

CHARCOAL PIG IRON.
Exclusively from New Bed Pure Magnetic Ore, suitable for Bessemer, Malleable and Car Wheel purposes, or for foundry use where very soft and strong iron is required.

Analysis of Average New Bed Pure Ore.

| | |
|------------------------------|---------|
| Metallic iron | 68.240 |
| Oxygen with iron | 26.010 |
| Water | 3.80 |
| Insoluble siliceous matter | 4.330 |
| Sulphur, practically none | — |
| Phosphorus | .008 |
| Alumina | .250 |
| Lime | .140 |
| Undetermined matter and loss | .592 |
| | 100.000 |

Analysis of No. 1 Bessemer Pig.

| | |
|---------------------------------|---------|
| Underdetermined matter and loss | .194 |
| Silicon | 1.019 |
| Carbon | 3.821 |
| Phosphorus | .048 |
| Sulphur, practically none | — |
| Calcium | .140 |
| Metallic iron | 94.838 |
| | 100.000 |

Witherbees & Fletcher,
Port Henry, Essex Co., N. Y.
Furnace at FLETCHERVILLE, near Mineville, N. Y.

Merchant Iron or Nails

Wanted in exchange for 300 tons No. 1 Wrought Scrap Iron.

GILCHRIST & GRIFFITH,
Mount Pleasant, Iowa.
EUGENE BISSELL, AUCTIONEER.
By BISSELL & CO.,
Successors to R. T. HAZELL & Co.,
Store No. 94 Reade Street.

Our REGULAR SALERS OF HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAY and FRIDAY throughout the season. CASH ADVANCES made on CONSIGNMENTS without additional charge.

THE McHaffie Direct Steel Castings Co.

STEEL CASTINGS.
Solid and Homogeneous, guaranteed to stand a Tensile Strain of 25 tons per square inch. An invaluable substitute for expensive WROUGHT IRON. FORGE-IRON or for Iron Castings, where great strength is required. Office, cor. Felling and Levent Sts., PHILA. DEL. PHILA.

Charcoal Blast Furnaces.
Having during the past 10 years constructed and put in operation a number of the most successful Charcoal Blast Furnaces in the country, and having a competent corps of workmen constantly in my employ, I am enabled to offer advantages in constructing or remodeling upon the latest and most approved plans.

Examinations of Furnace Property made and reported upon when solicited. Correspondence promptly attended to.

J. M. WHITE, Engineer,
22 W. Alexander St., Rochester, N. Y.

MANUFACTURERS
desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.

SCALE: First 3 lines, 8/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

An iron worker of large experience in this country and England, with the best testimonials as to character and capacity, wishes an engagement as manager or foreman of a mill or forge. Has had 30 years' experience in the manufacture of bars, hoops, plates, sheets, and puddle steel.

Address,
J. L.,
Office of *The Iron Age*, 10 Warren St., N. Y.

An Experienced Mechanical Engineer,
familiar with estimating and designing Propeller and general Marine Machinery, Locomotive, Corporation Pumping Engines, &c., will shortly be disengaged. Would like a superintendency or charge of a drawing room.

Address, for reference,
A. E. W.,
114 Fulton Street, N. Y.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers on Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. There is a special claim on each of the Dies. All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings,**
DEEP RIVER, Conn., Sept. 7, 1874.

Business Chances.

HARDWARE.
A man with from \$15,000 to \$25,000 cash, can connect himself with an old established Commission and Jobbing House in Boston, where capital is only required to extend the business. Address in full name.
P. O. Box 3205, Boston.

A PARTNER WANTED

by the 1st of January, 1875, in an established Hardware business, who can put in from \$20,000 to \$30,000, either cash, or stock suitable for jobbing trade.

For particulars, address, B.,
Office of *The Iron Age*, 10 Warren St., N. Y.

The firm of H. A. ROGERS & CO. (consisting of H. A. ROGERS and W. C. DUYCKINCK) is this day dissolved. The affairs of said firm will be exclusively liquidated and adjusted by W. C. DUYCKINCK, at the old store 50 and 52 John St., New York, January 18, 1875.

The subscriber will continue to conduct the business of importing, manufacturing and dealing in every variety of Railway, Machinery and Engineers' Supplies at the old store, 50 and 52 John St., New York. New price list now in press.

W. C. DUYCKINCK.

Wanted to Manufacture

Articles of Hardware either of Brass or Iron. For further information,
Address,
W. P.,
Office of *The Iron Age*, 10 Warren St., N. Y.

Special Notices.

A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools,
Shafting & Pulleys, Steam Engines,
Pumps & Rollers, Copper, Brass,
Tin, Rabbit Metals, Foundry
Facings. Best quality Ingot Brass.
Cash paid for all kinds of Metals and Tools.

HARDWARE.

FOR SALE in the best business part of Jersey City, a first-class Tool and Hardware business. Established about 25 years, and doing a fair business. Apply to
H. LUTIGEN,
57 Montgomery St., Jersey City.

Wanted,

By an experienced man, who has a large acquaintance with the wholesale and retail hardware and house furnishing merchants throughout the West, a position as traveling salesman. Can furnish good city references. Address,
P. A. C.,
Office of *The Iron Age*, 10 Warren St., N. Y.

MERCANTILE AGENCY.

For the sale of Hardware or any Mercantile Business. Stores of all kinds for sale and wanted. Parties desirous of going to business cannot do better than to address this agency. Also clerkships secured, or assistance, please address this agency. Those seeking situations include \$1 for registry fee, which also entitles them to three months' registry, if not successful on first application.

Address,
JOHN J. HARRIS,
Box 1633, Binghamton, N. Y.

For Sale.

IMPORTANT
To Bridge Builders & Contractors
for Iron Work.
FOR SALE,
About 20,000 pounds of Patent Rolled Hexagon Nuts, reamed and chamfered for Bolts from 1 1/4 in. diameter, at a very low price.

JOHN McANERNY & CO.,
Dealers in
Railway & Steamship Supplies,
63 BROADWAY, N. Y.

PUBLIC SALE

Of a Valuable Iron Property
In Augusta County, Virginia.

The undersigned Commissioners, in pursuance of a decree of the Circuit Court of Augusta County, Virginia, in three Chancery causes (brought out to be heard together), in which Denmead & Son, Raymond & Campbell, and Eyer, Cooper & Co., are respectively Plaintiffs, and the Buffalo Gap Iron and Steel Company and others, Defendants, will sell at public auction, on

Wednesday, the 3d day of March, 1875,

at BUFFALO GAP, in the aforesaid county, all the

REAL ESTATE

of above named company. Said Real Estate embraces a tract of

MINERAL LAND,

containing about 1450 acres, with

TWO VALUABLE IRON FURNACES

thereon; and a FARM of about 600 acres. These two parcels of land will be sold separately.

The Mineral tract lies in and around a depression in the North Mountain range, through which the Chesapeake & Ohio Railroad passes, known as Buffalo Gap. The veins of ore on this land have been partially developed, owing to the fact that the Furnace heretofore operated on it was plentifully supplied with good ore from the neighborhood, delivered at the furnace, at an average price of \$2.50 per ton.

Competent mineralogists and miners, who have examined the openings made on the property, express the opinion that ore exists on it in very large quantities.

There are quarries of good limestone on the land; and much of it is well timbered.

THE FURNACES

are immediately on the Chesapeake & Ohio Railroad, in the great Iron Region of Virginia, and about 150 miles from the Coal Fields of West Virginia, which are traversed by said road. They are ten miles west of Staunton and 147 miles west of Richmond.

FURNACE No. 1 has been in blast for several years, and has operated well. No. 2 is entirely new, indeed not quite complete; but the materials for its completion are on hand and the work can be done in a few days.

Each of them has an Iron Jacket Stack, built on iron columns. No. 1 is 35 feet high and 9 feet across the base, to which is connected a Flyer Hot Oven. No. 2 is 40 feet high, 10 feet across the base, with a Raymond & Campbell Hot Oven.

There are three Cylinder Boilers, 40 feet long, three feet in diameter, and in excellent condition; a 60 horse power engine with two blowing cylinders, capable of making 7 lbs. of blast to the square inch, and in complete order; two water tanks with a capacity of 60,000 gallons, supplied from a never-failing stream; a steam fire donkey engine, connected with several hundred feet of gum hose; an ample bridge or stock house, containing houses and two calcining kilns.

—In fine, the Furnaces are, in all respects, first-class, embracing a handsome and spacious manager's residence, office, storehouses, shops, laborers' houses and a neat chapel.

THE FARM

heretofore mentioned, adjoins the tract of Mineral land. It is well watered and timbered; and is very productive. Improvements consist of a large BRICK BUILDING, Grist Mill, Saw Mill, Tenant's Houses, a large Barn, and all the other out houses usually found on a good farm in the Valley of Virginia.

Parties proposing to buy are invited to examine the aforesaid property before the day of sale. Mr. John Thorne, who is in charge of the furnaces at Buffalo Gap, will take pleasure in showing the property; and the undersigned Commissioners, who may be addressed at Staunton, Va., will take pleasure in answering inquiries concerning the same.

At the same time, two places will be sold whatever PERSONAL PROPERTY the Buffalo Gap Iron and Steel Company may have on their premises at Buffalo Gap.

Terms on which aforesaid property will be sold are as follows: Ten per cent of the purchase money will be required in cash, 15 per cent in four months, and the balance in three equal annual installments from the day of sale, with interest from the last named day. For all deferred installments of purchase money, the purchaser will be required to give bonds with approved personal security, and the title will be withheld as ultimate security.

GEORGE M. COCHRAN, JR.,
THOS. C. ELDER,
Commissioners of Sale.

For Sale.

An extensive deposit of Iron ore, (Red Hematite) superior quality, 2 1/2 miles from Selma, Rome and Dalton Railroad, in Shelby county, Alabama. Specimen sent on application. Terms, \$3000, cash.

Address,
James T. Leeper,
Columbiana, Ala.

For Sale, &c.

FOR SALE,
Hardware and Stove Store,
A good complete stock, doing a cash business, situated in a thriving town in Central Ohio, at the crossing of two important railroads. Will sell part cash, balance on good time. Address, A. & F.,
Box 194, Bellefontaine, O.

MACHINERY FOR SALE.

The following machinery, &c., being that recently owned by the
American Rolled Nut & Tube Co.,
at very low prices. Consisting of several sets of
ROLLS, HOUSINGS, BED PLATES, &c.,
for Rolling Nuts, including machines for finishing. 1 train of

8 in. Guide Rolls.

Large quantity of

Rolls Nuts for Bolts,

from 1 1/4 to 2 in diameter, reamed and burred ready for use. Lot of

STANDING PLATES.

These nuts have been extensively used, and are regarded as equal to any made, and will be sold much under the market value. Will also sell a

Fourth Interest in the Patent for making these Nuts.

It is confidently believed that nuts can be made on this plan cheaper and better than on any other yet adopted, and may be rolled of any length or size that may be required. A 1 of the above machinery is nearly new and in complete order. For further information, apply in person or by mail to
N. C. NEWTON,
Metropolitan Iron Works, Richmond, Va.

For Sale.

A Zinc Mill, consisting of Rolls, Furnaces, Shears and Tools, all in complete order, ready to run at once. Situated near New York on leased ground. Lease covers buildings, engine and boiler, and is a valuable one, having privilege of extension. For full particulars, address,
Box 2166 N. Y. P. O.

For Sale!
Hardware Business
In a growing manufacturing town, one of the best locations in Vermont. Business well established and profitable. Stock about \$15,000 in good order. This affords an excellent opportunity for a party with small capital to secure a paying business. Address,
W. R. BIXBY & SON,
Vergennes, Vt.

To Rent.

First and third floors—together or separate. Brick building 125x50, well lighted and the best business location in the city. Light power will be supplied if desired, or parties can furnish their own if preferred. Address, with particulars,
H. D. STANLEY, Secretary,
Bridgeport, Conn.

For Sale or Rent on Easy Terms
A four story brick factory 46x60 ft, with unfailing water power of about 25 horse-power, auxiliary steam engine of 20 horse-power. Adjoining are office, barn and other outbuildings. Situated near depot of three railroads, and lines of boats to New York and Philadelphia. Every facility for manufacturing and getting goods to market at cheapest rates. Apply in person or by letter to either
JOSEPH W. ALSOP,
ROBERT N. JACKSON, Executors.
CHARLES E. JACKSON,
Middletown, Conn.

FOR SALE.

An 1/2 inch mill train for making Merchant, Band and sp. Iron. Will be sold cheap.

Apply to
W. W. JONES,
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

MACHINIST TOOLS
FOR SALE CHEAP.
Owing to the removal of our factory, we will at once dispose of such tools generally found in a first-class machine shop. Send for catalogue and prices. Parties desiring to start a jobbing shop can find no better location and easy terms. Address,
SUP'T. BURRITT,
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Hibernia Iron Works.—This property is situated in Chester county, on the Wilmington and Reading Railroad, four miles north of Coatesville. It consists of a rolling mill for making fine or boiler plates; a forge with four fires and run-out for; grist and saw mill; also farm of about 200 acres, with fine mansion house. Will be sold or rented, separate or together, on easy terms to a good tenant. Apply to **James H. Bull,** West Chester, Pa.

FOR SALE.

At Lowest Manufacturers' Rates.
GUNS & SHEET ZINC,
Best German and Belgian Brands,
By **LOUIS WINDMULLER & ROELKER,**
20 Reade Street, N. Y.

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Translator for MANUFACTURERS
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C. KIRCHHOFF
Commercial Editor "El Cronista,"
Box 2806, N. Y.

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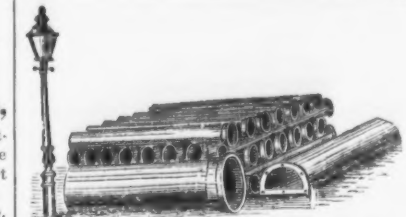
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R. D. WOOD & CO.,

Philadelphia,
Manufacturers of

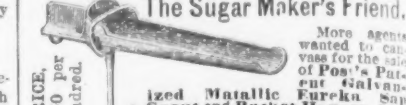
Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.



The Sugar Maker's Friend.

More Agents wanted to call on the Sugar Maker's Friend.

Gold Medal at Md. Int. Exposition, Oct. 1874.

Erless-Lever House & Weight Mover.

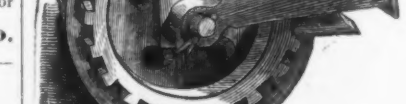
Patented January 14, 1873.



Send for Circular and Price List.

THE REAMY TRUCK CO. of Baltimore, Md.

Incorporated, Oct. 1874. Reliable State Agents Wanted.



THE CANADIAN BANK OF COMMERCE.

Capital - - \$6,000,000, Gold.

Surplus - - \$1,800,000, Gold.

The New York Agency, 50 Wall St.,

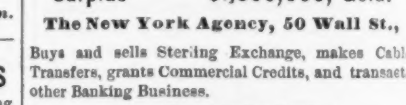
buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER, Agents.

J. H. GOADBY, Agents.

BUTCHER-BOY

Draw-Cut Machines.



SAUSAGE CHOPPERS

Pipe, Fittings, &c.

Thomas T. Tasker, Jr.

Stephen P. M. Tasker

MORRIS, TASKER & CO.,

PASCAL IRON WORKS, Philadelphia,

TASKER IRON WORKS, New Castle, Del.,



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Office and Warehouse, No. 15 Gold Street, New York.

Office and Warehouse, No. 36 Oliver Street, Boston.

MANUFACTURERS OF

WROUGHT IRON WELDED TUBES,

Plain, Galvanized and Rubber-Coated, for Gas, Steam and Water.

Lap-Welded Charcoal Iron Boiler Tubes.

Oil Well Tubing and Casing, Gas and Steam Fittings, Brass and Steam Fitters' Tools, Cast Iron Gas and Water Pipe, Street Lamp Posts and Lanterns, Improved Coal-Gas Apparatus, Etc.

Ecton Mills Genuine London TURKEY EMERY.

TRADE MARK.



ABBOTT & HOWARD, Agents for the United States.

81 John Street, New York.

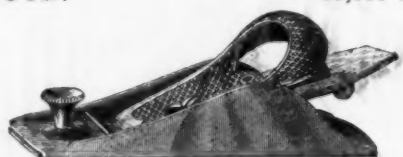
35 Oliver Street, Boston.

BAILEY'S PATENT ADJUSTABLE PLANES.

Thirty different styles in

IRON AND WOOD.

80,000 ALREADY IN USE.

Smooth Planes,
Jack Planes,
Fore Planes,
Jointer Planes,
Block Planes,
Rabbit Planes,
Circular Planes.Carpenters,
Cabinet-Makers,
Car Builders,
Carriage-Makers,
Millwrights,
Wheelwrights,
All Use them.Manufactured by the **STANLEY RULE & LEVEL CO.,**
Factories: New Britain, Conn. Warehouses: 35 Chambers Street, New York.**AMERICAN LOCK MFG. CO.,**

Manufacturers of

**FELTER'S
Locks & Latches,**

Comprising

Store Door Locks, Night Latches,
Drawer, Desk and Pad Locks,

All of which are furnished with

SMALL, FLAT, AMERICAN STERLING METAL KEYS,

Which are stronger than steel, and cannot be affected by rust, and will remain bright and clear under all ordinary circumstances.

A candid examination will convince the most unbelieving that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, they will rival the best made Locks in Finish and perfect operation.

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock ever presented to the public, having thirty-five finely finished Brass Tumblers in each Door and twenty-eight in each Drawer Lock, each one being finely false notched. Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.

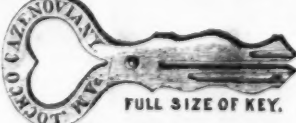
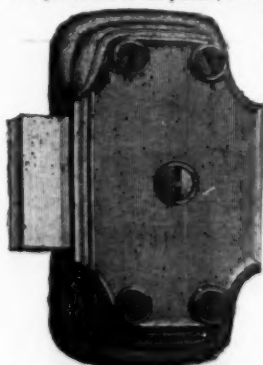
THE LOCKS ARE FITTED TO THE KEYS,
And not the Keys to the Locks.

Hence Counterfeit Keys cannot be made.

For descriptive list and terms, address,

UNION NUT CO., Sole Agents,

78 Beekman Street, New York.

**New Patent "X" Razor Strap.**

PATENTED DECEMBER 23, 1873.

This Strap, designated on our List as Letter "X," is of novel construction—is elastic, pleasantly yielding to the razor—gives a keen fine edge—is made of superior stock—is furnished at a low price—and gives universal satisfaction.

ITS PRICE SELLS IT.

BENJAMIN F. BADGER, Sole Manufacturer,

Badger Place, Charlestown, Mass.

Pipe, Fittings, &c.

National Tube Works Co.,

BOSTON, MASS. and McKEESPORT, PA.,

MANUFACTURERS OF

Best Quality Lap Welded Iron Boiler Tubes,**STEAM AND GAS PIPE,**

Artesian Oil and Salt Well Tubing and Casing,

With Patent Protecting Coupling;

Mack's Patent Injector for Feeding Boilers.

JAMES C. CONVERSE, President,

McKeesport.

WM. S. EATON, Treasurer,

Boston.

New York Office and Warehouse 78 William cor. Liberty Street.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS

For STEAM, WATER and GAS.

Wrought Iron Pipe & Fittings, Plain and Galvanized

PLUMBERS' MATERIALS.

Illustrated Catalogue sent by express to the Trade on application.

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PANCOAST & MAULE

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PHILADELPHIA.

WROUGHT IRON PIPE

FITTINGS, BRASS & IRON VALVES & COCKS

TOOLS & STEAM FITTERS SUPPLIES &c.

PIPE CUT & FITTED TO PLANS FOR MILLS &c.

CONTRACTORS

FOR HIGH & LOW PRESSURE STEAM HEATING APPARATUS FOR ALL CLASSES OF BUILDINGS.

Send for Illustrated Catalogue.

EATON & COLE.

Manufacturers of

Wrought Iron Pipe
Fittings,BRASS
VALVES,

COCKS, TOOLS, &c.,

58 John Street, NEW YORK.

Sole Agency for the Pacific Coast for

Register's Patent Gauge Cocks,

CONROY, O'CONNOR & CO.,

San Francisco, Cal.

CAST IRON PIPES

FOR WATER AND GAS.

Branches Retorts, &c.

Warren Foundry & Machine Co.,

PHILLIPSBURG NEW JERSEY.

**WHEATCROFT'S
SELF-ADJUSTING PIPE WRENCH.**

Forged from Best Tool Steel.

The dog is solid over the head of the lever bar, taking the strain off from the pin.

Each Wrench takes four Sizes of Pipe.

J. AUSTIN & CO. 168 Fulton St., N. Y.

Nelson, Finkel & Co.,

439 East 10th St., New York,

Manufacturers of

Jenkins' Patent

Compression

Valves

AND

Gauge Cocks

Also,

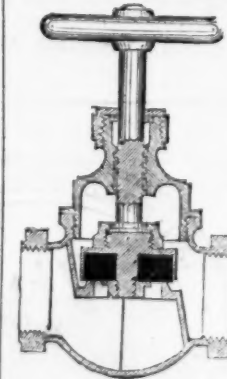
Nelson's Patent

LUBRICATOR.

Warranted the most

reliable and durable

in the country.

**Chapman Valve Mfg. Co.,
STEAM VALVES,**

Iron and Composition, of all sizes.

WATER and GAS Gates, 3 to 48 inches
HYDRANTS.

Office and Warehouse, 75 & 77 Kilby St., Boston, Mass.

**TURNED
MACHINE SCREWS,**

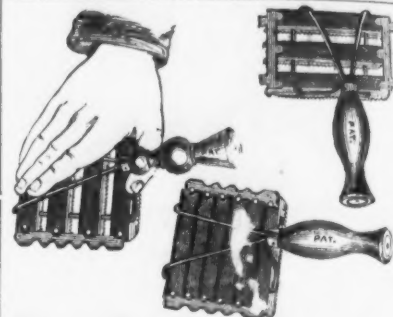
One-sixteenth to five-eighths diameter.

Heads and points to sample.

IRON, STEEL and BRASS.

Lyon & Fellows Mfg. Co.,

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**The Perfect Comb.**We call your attention specially to our new patent end-less wire frame comb. The result of a long series of experiments, made with a view to meeting all the requirements of a Perfect Comb. It is better, stronger, and more durable than any ever before in vogue. The raised wire shank gives what has never before been attained, viz: a rest and brace for the thumb, in such a position that the hand cannot come in contact with the horse while using the comb. The wire braces which run from the shank over the back to the front teeth give strength and durability in a direction never heretofore attained, and at the same time serve as an extra handle; and when clamped by the fingers in connection with the raised shank the comb is more firmly, easily, and completely held, and with much less fatigue to the hand than is possible in any other formation—in short, it needs but a trial to vindicate its name: **The Perfect Comb.****THE LAWRENCE COMB CO.**

Factory and Office,

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WILLIAMS WHITE & CHURCHILL

Successors to

MACKRELL & RICHARDSON MFG. COMPANY

Manufacturers of

Builders' Hardware,

Locks, Hinges, Hooks and Staples,

Awning Hooks, Meat Hooks, Pincers,

Champion Noiseless Pulleys,

CHAIN PULLEYS &c.

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Warehouse, 73 Warren St., N. Y.

WM. S. CARR & CO.

Sole Manufacturers of

Carr's Patent Plumbers' Goods

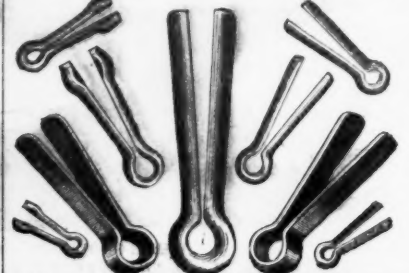
Pumps, Water Closets, Fountains,

Vases, &c.

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Factory, Mott Haven, New York.

GEORGE BARNES & CO.,

Manufacturers, Syracuse, N. Y.

DRILLS,

Pipe Tongs,

Pipe Cutters,

Pipe Threaders,

Flue Brushes.

M. D. CONVERSE & CO.,

68 Park Place, N. Y.

**Rogers' Self-Sharpening
HOE.**

The best Hoe in market. It will not batter or break. Wears itself sharp. Will last twice as long as any other Hoe, and is warranted to cut the "Bolles Hoe" or any Hoe in market.

For Sale at Manufacturers' Prices by

RUSSELL & ERWIN MFG. CO., - - New York.

BYRNE & FITZSIMONS, - - Albany, N. Y.

KENNED SPAULDING & CO., - - Syracuse, N. Y.

HIGHEST PREMIUM AWARDED,

FRANKLIN INSTITUTE, PHILA.



HENRY DISSTON & SONS KEYSTONE
SAW TOOL
STEEL & FILE WORKS.
PHILADELPHIA

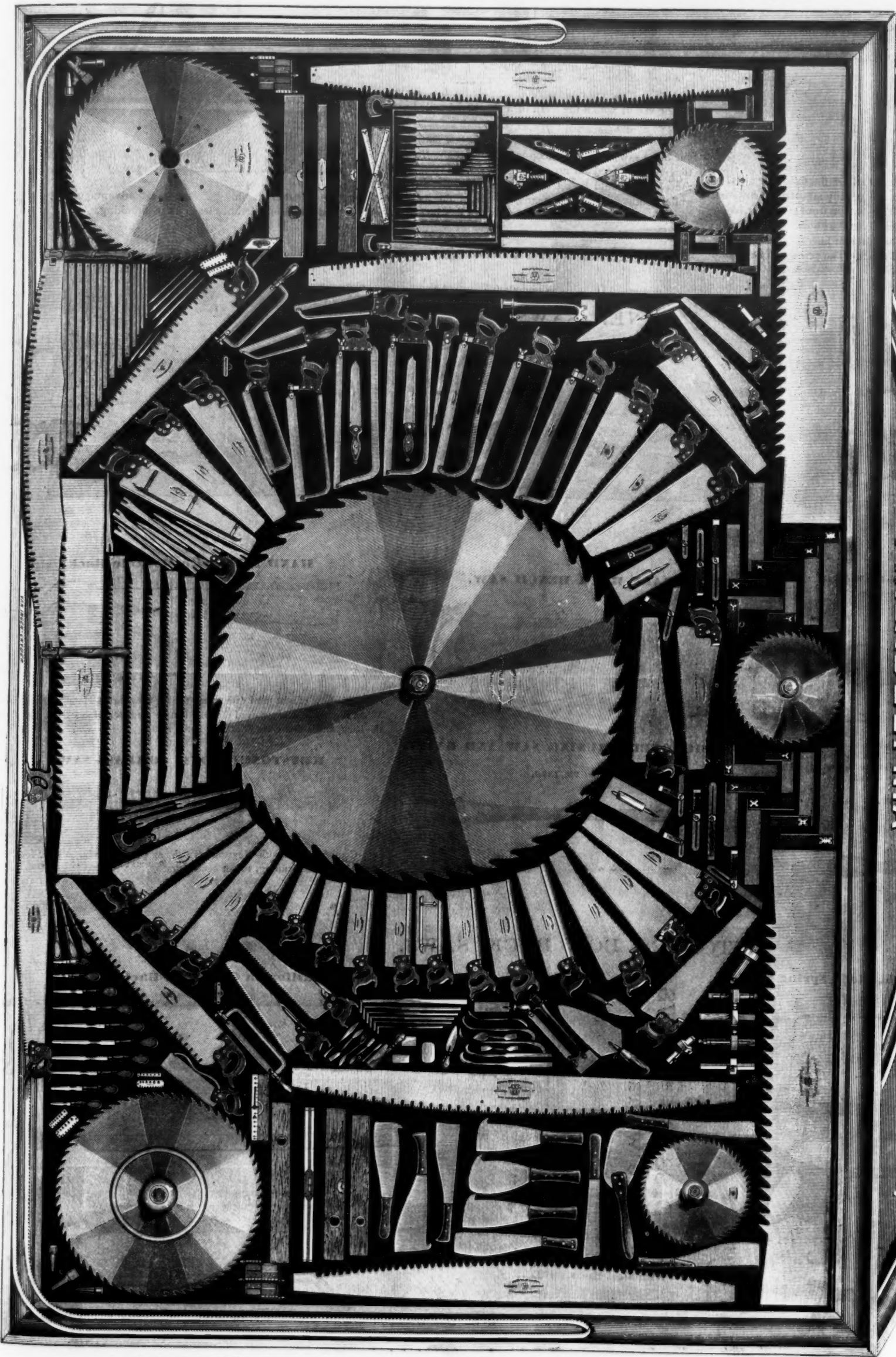


BRANCH HOUSE,
Randolph and Market Sts.,
CHICAGO.

Manufacturers of SAWS
of every description. Also,
all kinds of Saw-Files and
every description of Labor-
Saving Tools and Implements
for keeping Saws in perfect
order. Also, manufacturers
of Sheet Steel and articles
made from the same, Steel
Forgings, etc., etc.

With the advent of an-
other year we desire to
greet our numerous cus-
tomers, thanking them for
the very liberal patronage
extended to us heretofore,
and to pledge ourselves to
renewed exertions for the
future. We have recently
made new and extensive
improvements both in
buildings and machinery,
a large portion of which is
patented and peculiar to
our establishment, and we
are determined not only
to maintain the reputation
and standard quality of our
manufactures, but to im-
prove the same wherever
possible.

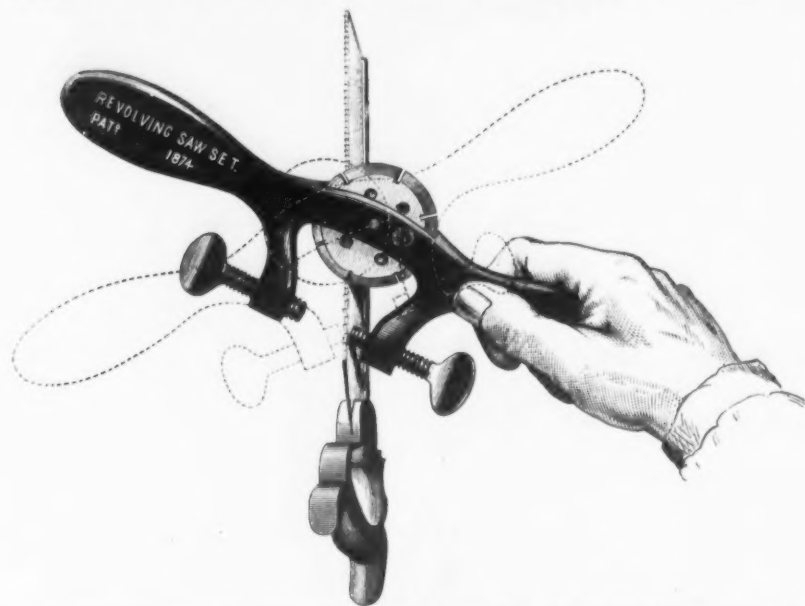
We will execute all or-
ders entrusted to our care
with promptitude and dis-
patch, guaranteeing satis-
faction in all cases. Our
illustrations in this week's
paper comprise but a por-
tion of our manufactures,
and to them we desire to
draw the special attention
of the trade, feeling as-
sured that we can in every
instance give the satisfac-
tion which shall be the
Harbinger of Continued
Patronage.



Branch Works,
TACONY, PA.

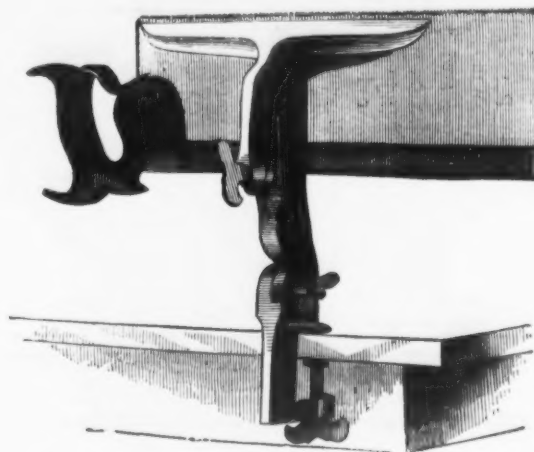
Thirty years ago we adop-
ted the No. 7 as a distinc-
tive mark for one of our
Standard Saws. The satis-
faction it has given and the
immense sales which have
been and are still being
made throughout the land,
sufficiently testify of its
merits. But not to the
No. 7 alone do these re-
marks apply. All standard
saws of our make have met
with unqualified approval
from a generous and appre-
ciative public; and our suc-
cess in business has been
greater than our most san-
guine dreams had ever pic-
tured. To what circum-
stances, then, must we
attribute this popularity
and prosperity?—simply
that it has been our aim
and object to give the
workman the honest
value of his money, and
to make a better article
than it was possible to im-
port. A poor man buys a
low-priced Saw because of
his poverty. Is that any
reason why he should be
cheated with a worthless
article? We claim to make
the best Saw for its cost in
the world, and one trial
will prove the truth of our
assertion.

HENRY DISSTON & SONS' PATENT REVOLVING SAW SET.



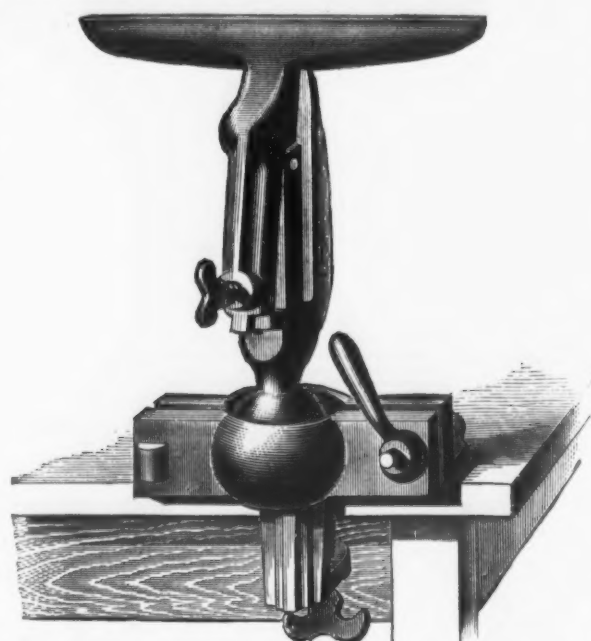
Among the advantages claimed for this useful little tool are the following: 1st. It is portable, simple, effectual, and cheap. 2d. It can be readily adjusted to any size tooth from a 14 point back saw to a 4 point rip saw. The tooth in front of the one being set forms a guide for the tool, and the operator can readily and with certainty slide the set from tooth to tooth even with his eyes closed. The different bevels on the disk are in accord with the different slots for the various sized teeth. The screws on each side determine the amount of set.

IMPROVED UNIVERSAL SAW CLAMPS.

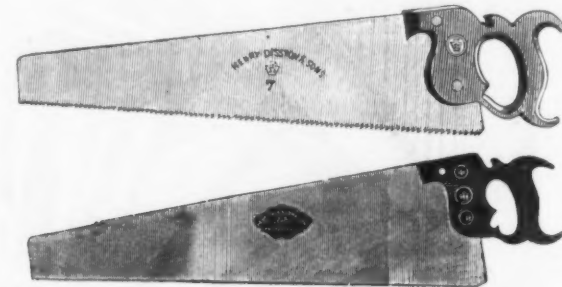
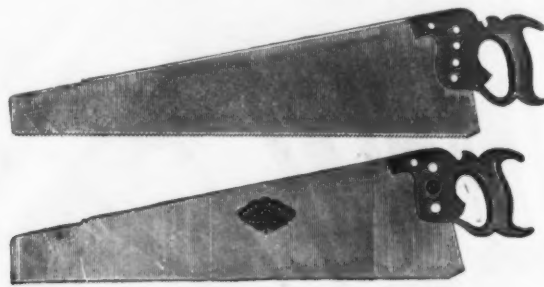
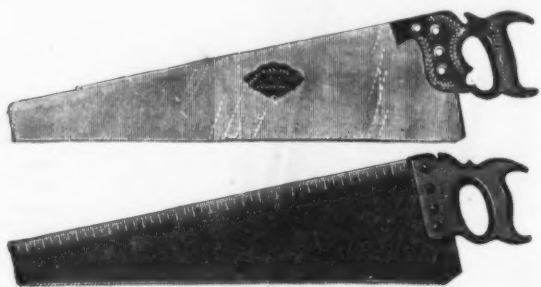


The above engravings represent new style saw clamps, by the use of which the teeth of a saw can be filed on any desired angle.

Experience has demonstrated that a fast cutting cross-cut hand saw must have deep teeth. To make them deep, they must be filed on an angle. To do this to advantage, the clamp should be set to the desired angle, and a deep gullet tooth can, by this means, be filed quite as readily as a square bottom tooth. Another great advantage to be derived from this mode of filing is, that the teeth can be set more easily and with considerably less risk of breaking.

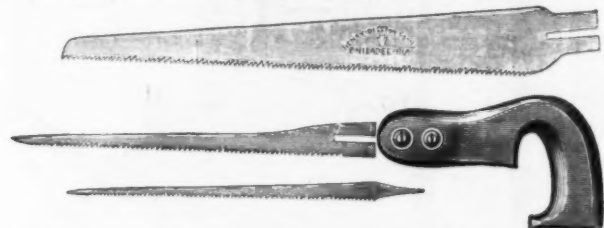


PANEL SAWS.



NEST OF SAWS.

Combining one each Keyhole, Compass, Table or Pruning Saw.



These Saws are admirably adapted to Plumbers' use, where blades are frequently broken, as they can be immediately substituted in the same Handle at trifling cost. They will also be found a great acquisition to the Gentleman's Tool Chest, the three blades readily interchanging in the same Handle. The large blade can be used as a Table or Pruning Saw, and the smaller ones as Lock, Compass, or Keyhole Saws.

Improved Reversible Hack Saw.



GENTS' HALF BACK BENCH SAW.

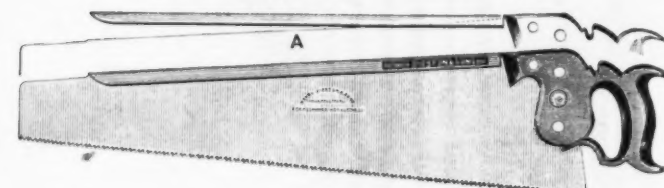


DISSTON'S IMPROVED PRUNING SAW AND KNIFE.

Patented August 29, 1873.



HAND SAW, with Movable Back.



This Saw can be used with equal facility for either a Hand or Back Saw. When the back A is removed the Saw can be used as a Hand Saw. Replace the back, and a first-class Back Saw is the result.

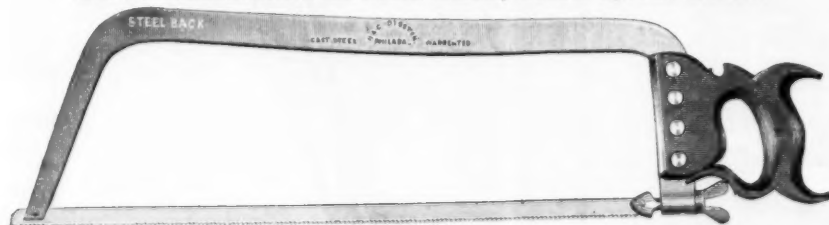
KEYSTONE TOOTH COMPASS SAW.



Compass Saws with Keystone Tooth, as per engraving above, for both ripping and cross-cutting, 10 per cent. extra.

BUTCHERS' BOW BACK SAWS.

No. 1. California Flat Steel Back, Clock Spring Blade.

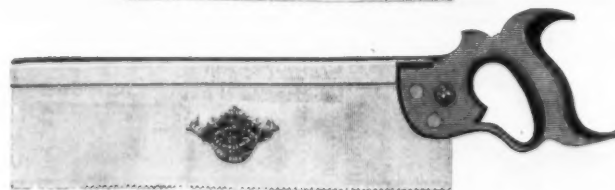


No. 1. Oval Back.



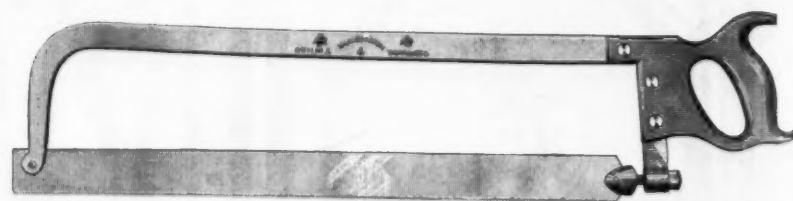
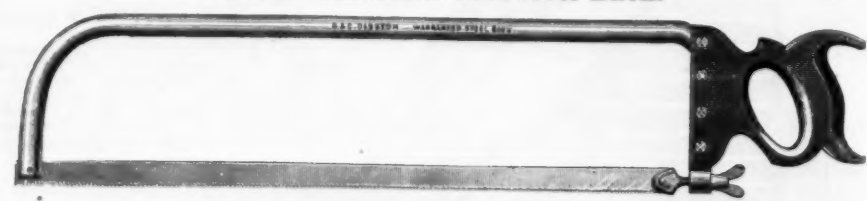
"DISSTON" SAWS
are warranted.

Improved Quality Cast-Steel Back Saws.
With Steel Backs.

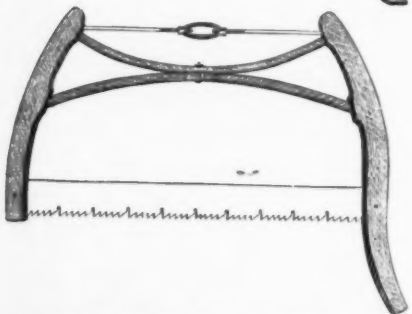
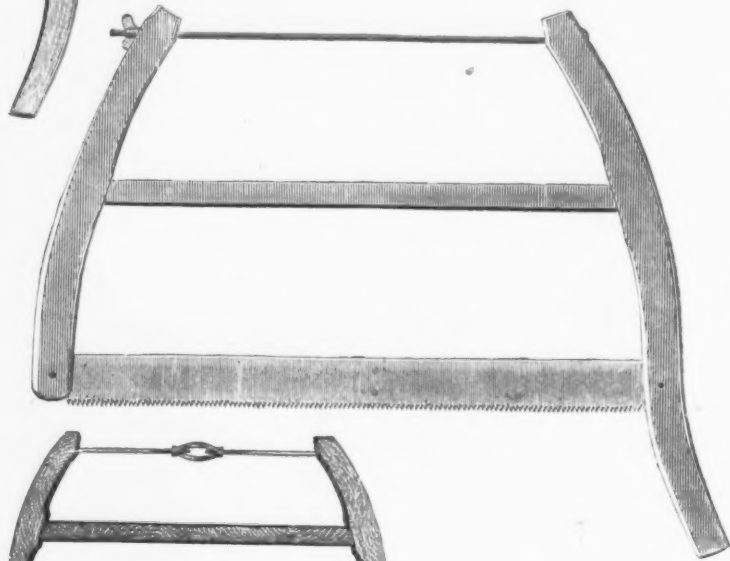
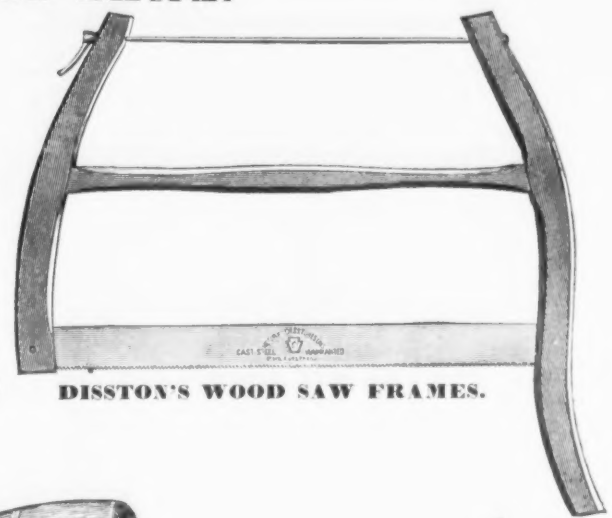
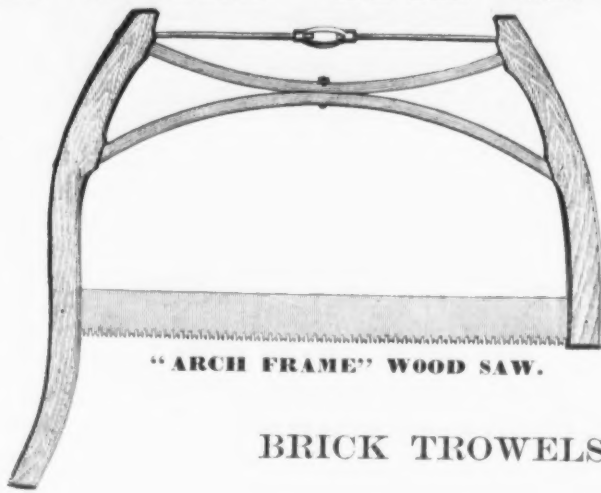
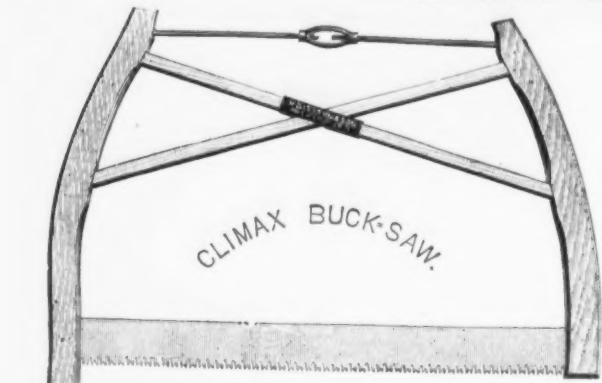


No. 77. Back Saw, Disston & Sons' "Mechanics' Own," to run without set.

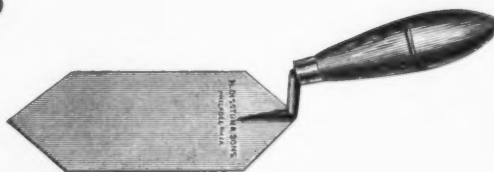
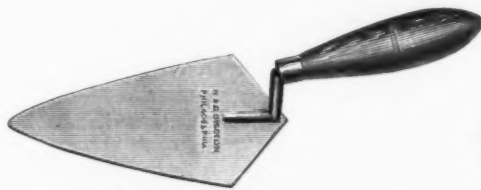
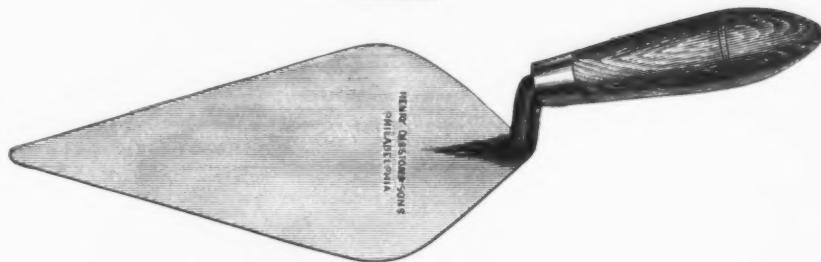
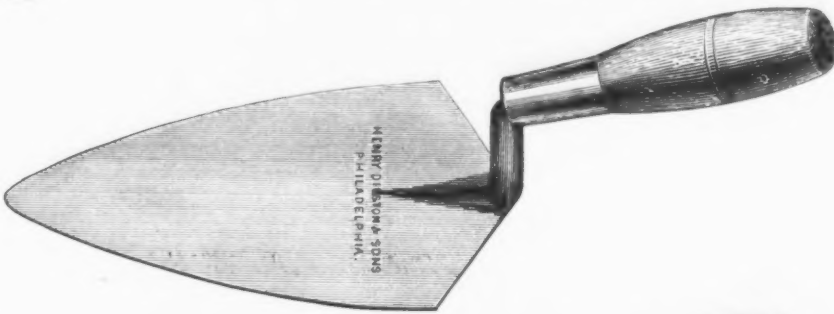
No. 2. California Oval Steel Back.



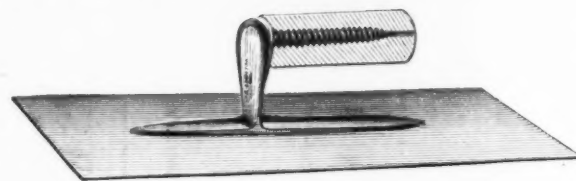
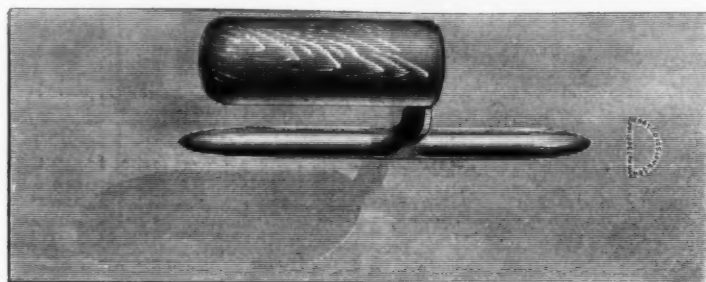
HENRY DISSTON & SONS' "BUCK" OR WOOD SAWS.



BRICK TROWELS.



PLASTERERS' TROWELS.

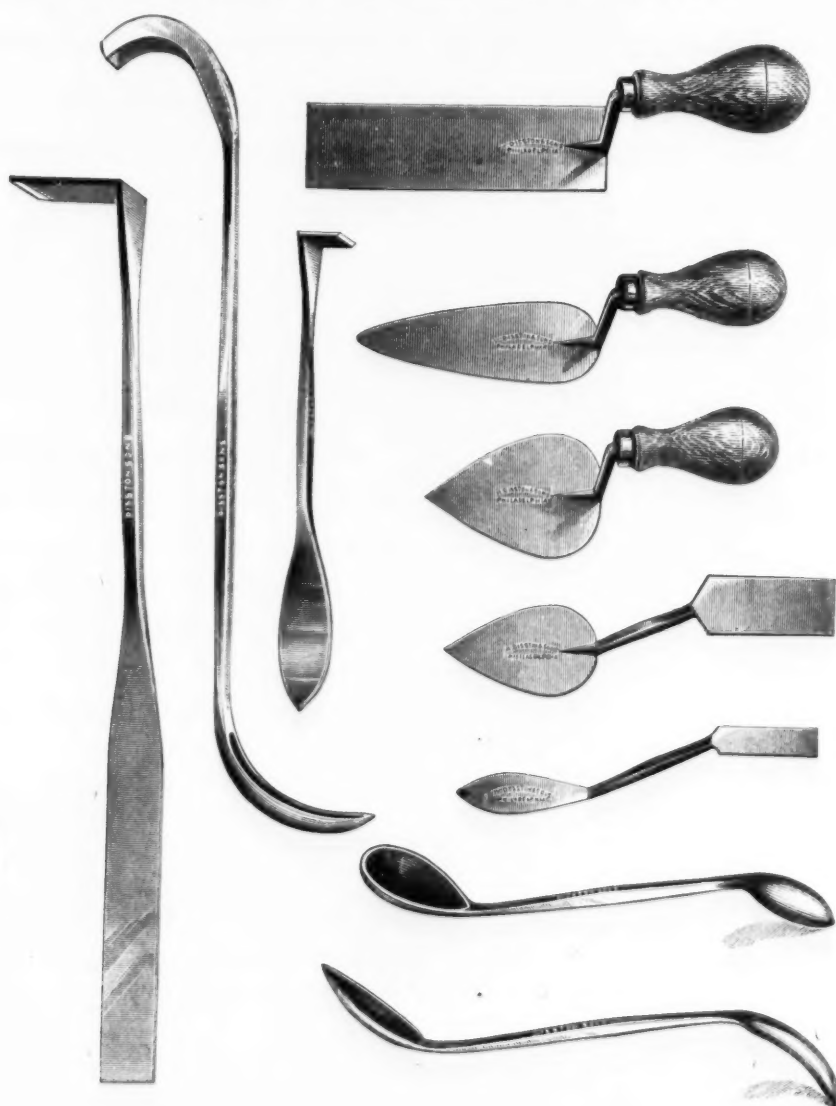


WARRANTED CAST-STEEL CANE KNIVES.

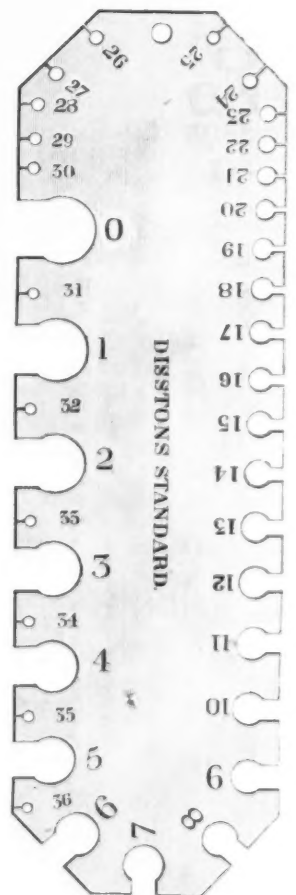


MOULDERS' TOOLS.

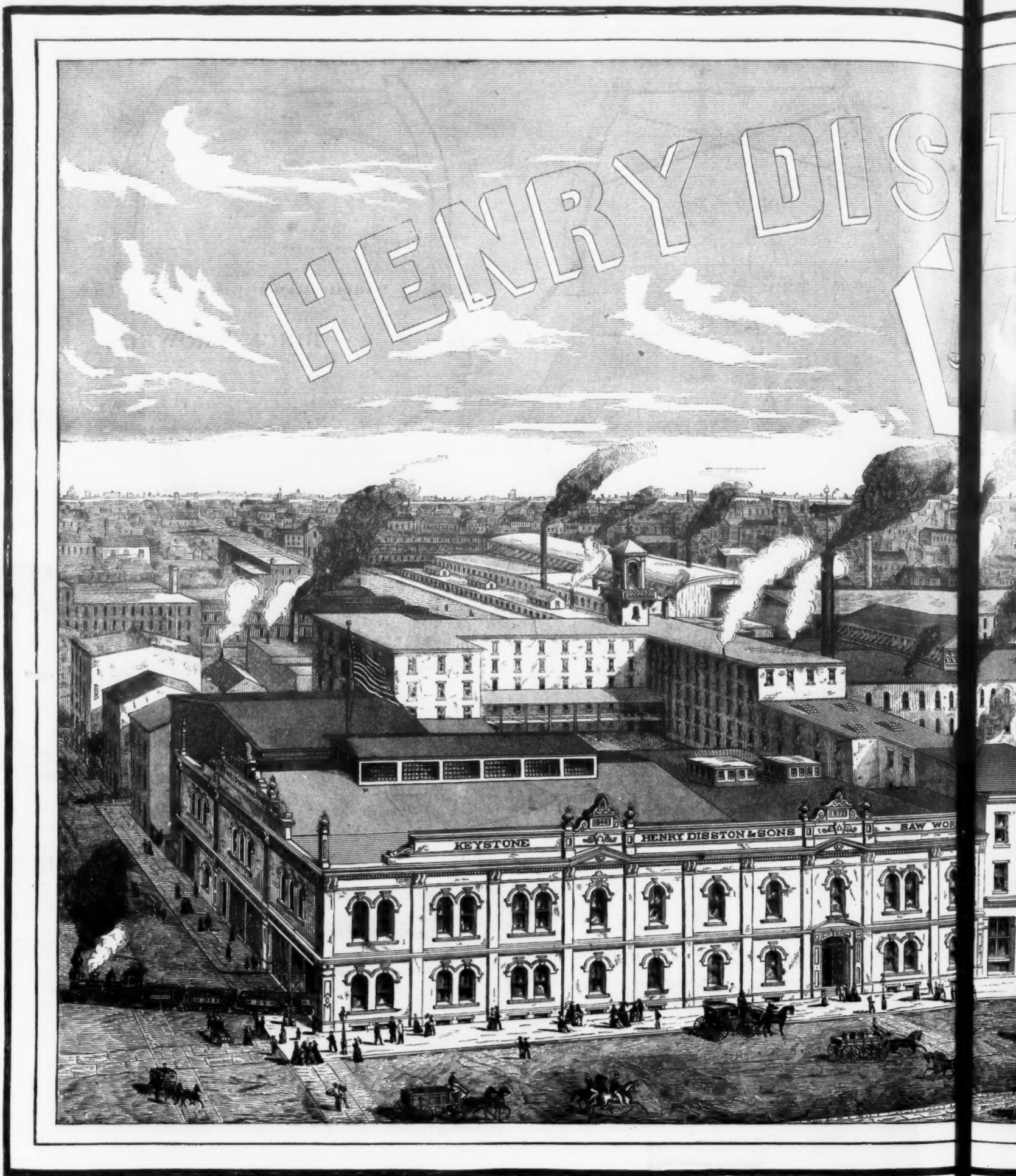
A practical moulder superintends the manufacture of these goods, which are made from the best quality cast-steel, perfectly tempered, and warranted.



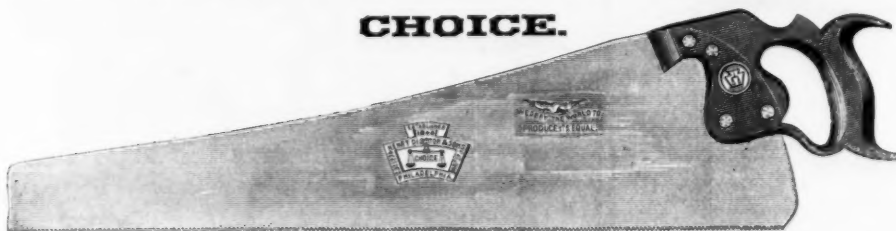
All goods marked "DISSTON" are fully guaranteed.



All goods marked "DISSTON" are fully guaranteed.



HENRY DISSTON & SONS'
New Patent Skew-back Hand-Saw,
CHOICE.



This Saw is the "**CHOICE**" of all first-class Mechanics who have used it.

It is singular, yet true, that although immense improvements have been made, of late years, in the Hand Saws of centuries ago. We have recently patented a Hand Saw which, we believe, is stronger in proportion to the amount of metal in the blade, and more free from tremor when used, than the old style. They bring the operator closer to his work, and thus prevent the possibility of an accidental blow or a fall. The Rip Saw handle is coped out to admit the thumb of the left hand, thus giving use both hands.

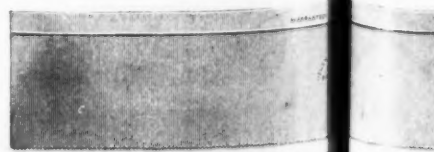


GAUGE SAW, for Sawing a definite depth.

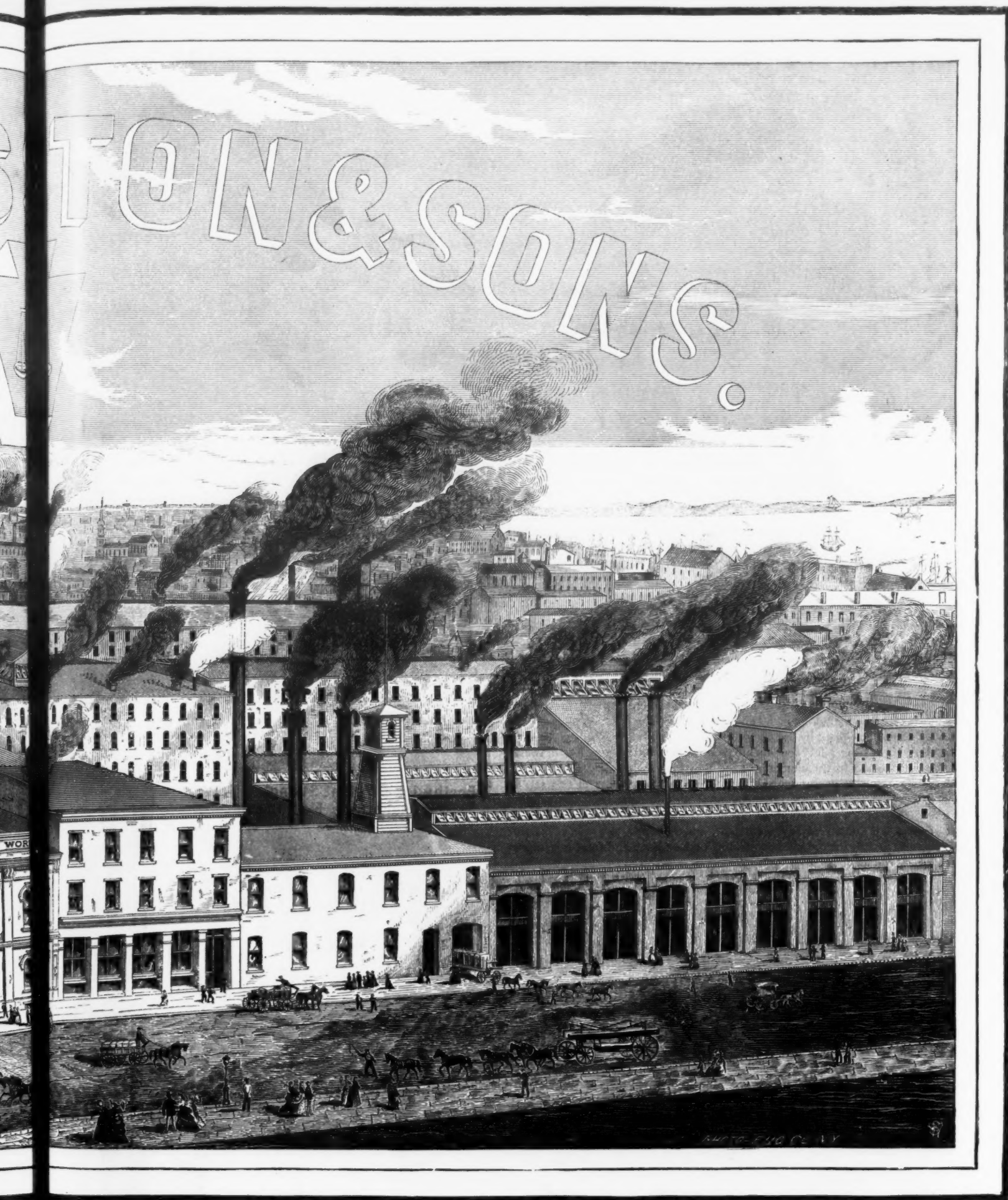
HENRY DISSTON & SONS'
Patent Skew-back Hand-Saw,
No. 7.



Even in price and quality our Patent Skew-back Hand-Saw is warranted to give satisfaction.



MITRE BOX SAW.



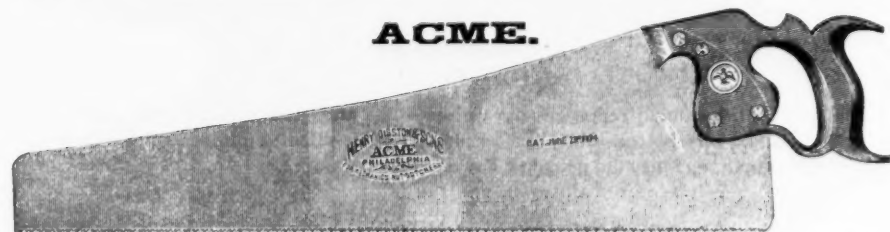
Y & SONS'
ew Hand-Saw
No. 7.

and of our celebrated No. 7
to perfection every time.

late the grinding, temper, and finish of Hand Saws, still in shape and style they much resemble
believe numerous advantages over the old-style Saw, being lighter and more easy to handle,
than the ordinary Hand Saw. To these Saws are attached our new patent handles, which
rk, as of them the blade of the Saw is imbedded in the handle, imparting strength in case of an
ft hand give the operator unlimited power and command over the Saw when it is desirable to

AW. Mitre Boxes made to order.

HENRY DISSTON & SONS'
New Patent Skew-back Hand-Saw,
ACME.



We consider these Saws to be the ACME of perfection.
So say all first-class Mechanics who have used them.



COMBINATION SAW.



ADJUSTABLE HANDLE HAND SAW.



FULL COMBINATION SAW.



No. 7. HAND SAW.

Any Saw marked "DISSTON" proving defective will be exchanged.



DISSTON'S "STAR" SAW SET.

A is the plunger, which is operated by a treadle attached to E, under the machine; B, the hammer or striking part; C, the anvil; D, the movable gauge; F, the screw, to regulate the amount of set. The striking part and the anvil, or portion which receives the blow, are star-shaped and similar in construction. The points are all of different sizes, and are numbered from 1 to 6; and are designed to set different size teeth. Prominent among its advantages is the fact, that it can be operated wholly by the foot by means of a treadle, thus leaving the hands to guide and manipulate the saw.



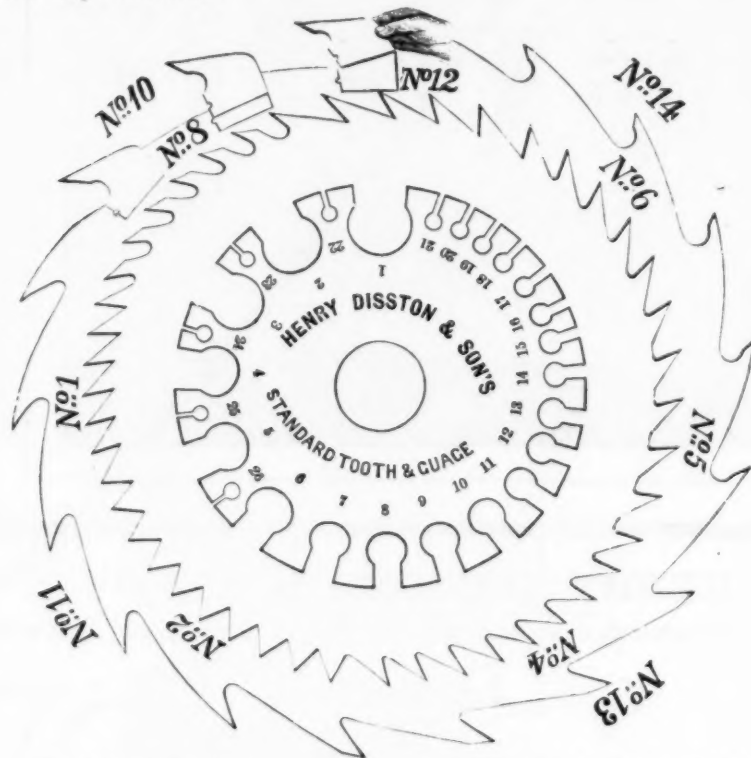
DISSTON'S PATENT GULLET-TOOTH CIRCULAR SAW.



By reference to the above engraving, it will be observed that the back or point line of each Tooth is the continuation of the spiral lines Z, and the sharpening is mainly done by the reduction of the gullet or throat only. This is readily accomplished by the use of our Patent Gummers (see inside pages).

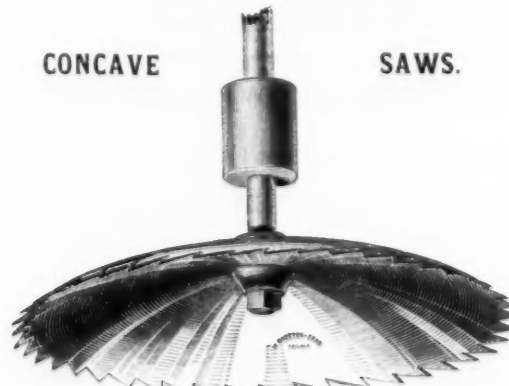
The course pursued by the cutter is spiral, and while it is in the act of reducing the front or throat of the Tooth D, it is prolonging the back or point line of the Tooth C. The engraving represents a two-inch Tooth or Gullet. The Saw B is the Saw A worn down. When the Saw has been reduced on centre line from G to F, it has been worn away but six inches, yet has presented a cutting surface on spiral line Z from G to Y, a distance of twenty-four inches. But this is only one of the advantages claimed for our patent Gullet-Tooth. The throat or gullet being chambered out on a half circle, forms a receptacle or chamber for dust, and thus a one-and-a-half-inch Tooth of this pattern will keep a Saw as free from choking as a two-inch Tooth of the ordinary shape.

The saving of the Saw-plate by the use of a smaller Tooth is evident to the most casual observer. In wearing a fifty-four-inch Saw down to a forty-two, a loss of twelve inches has been sustained in the diameter of the Saw-Plate, which is six sets of two-inch Teeth, or eight sets of one-and-a-half-inch Teeth, an advantage of two sets in favor of our new patent Gullet-Tooth, independent of the immense gain by gumming on spiral lines. The crowning triumph of this Saw is the fact that it can be kept in order with one-tenth the labor of any other Saw, and is bound to preserve its true circular shape; whereas by the old method of filing both on back and front it is impossible to keep a Saw round.



The above illustration represents our various styles and sizes of Saw Teeth, also our Standard Gauge. By consulting it a person will be enabled to inform us the size and style of Tooth, and also the gauge of any Saw he may desire.

CONCAVE SAWS.

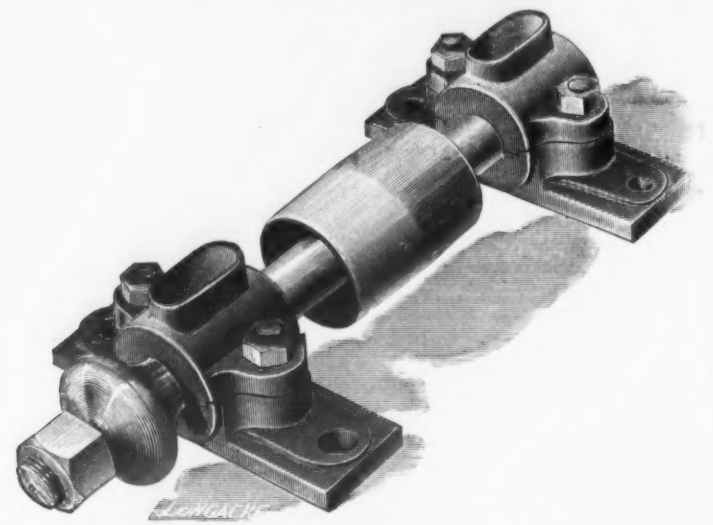


The attention of the manufacturers of chair- or wheelwright-lumber, barrels, etc., is respectfully called to Concave Saws, of which we are manufacturing large quantities. They are dished and tempered by an entirely new and patented process, and guaranteed to be of superior quality in every respect. We furnish these Saws considerably cheaper in consequence of our new mode of manufacture.

THE BULLY BOY SAW SET.



CIRCULAR SAW MANDRELS.

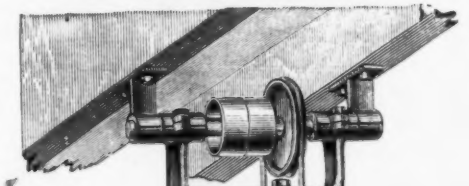


AUTOMATIC SAW FILER.

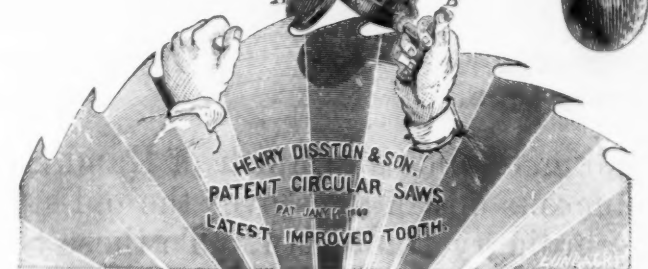


Any Saw marked "DISSTON" proving defective will be exchanged.

Borthwick's Patent Swinging Saw-Sharpening Machine.



THE SAMPSON SAW SET.



Henry Disston & Sons' Improved Adjustable Setting Stake for Circular Saws.

ATTENTION! HALT!!

IMPORTANT to Hardware Dealers, Lumbermen, and all Parties interested in

CROSS-CUT SAWS.

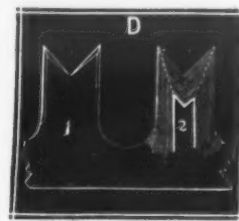
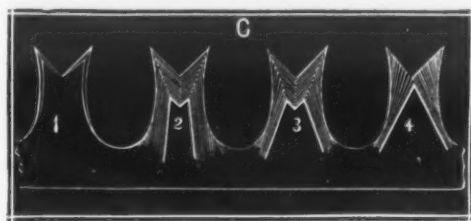
We desire to call special attention to our various styles of Cross-cut Saws represented in this week's issue. In the manufacture of all our Fast-Cutting Saws, we have carefully avoided the pernicious and destructive practice of making UNDER-CUT TEETH.

All Saws made on this principle are miserable failures. It is simply applying a Rip Tooth to the purpose of cross-cutting, an idea which has been long ago exploded. To get an UNDER CUT, the Tooth must be wider at the extreme point than at any other part, and each successive filing must result in rapid reduction in the width and ultimate loss of shape, as shown in the annexed diagrams.

No. 1, Fig. C, represents the undercut Tooth as it leaves the factory; Nos. 2, 3, and 4, Fig. C, show how No. 1 must ultimately become under any style of filing that may be adopted. No. 1, Fig. D, shows a Tooth with parallel edges, and No. 2, Fig. D, shows the shape of said Tooth after several filings. The white lines on the diagrams represent the successive cuts of the file.



On the other hand, the annexed engraving represents a section of "Lumberman" Cross-cut Saw, with File specially adapted for keeping said Saw in order. By using the File here illustrated, with the edge made to fit the gullet or space between the Teeth, and pressing downward while filing, you will preserve the original shape of the Teeth as described by dotted lines and notch in engraving. You pay for the edge of the file as well as the flat—then why not use it? and thus keep your Saw always gummed and in order, and avoid the risk of breaking or buckling the Saw by the old method of gumming. This File is manufactured expressly for the purpose of keeping in order the Teeth of our Improved Saws known as the Climax and Lumberman, and can be used with equal facility on either Saw. If the File be used according to our instructions, viz.: pressing down in the gullet at the same time the edge of the Tooth is being filed, the effect will be so convincing that persons will never return to the use of the old-style File, or any other of the so-called Improved Teeth. We also manufacture a File for keeping the Great American and Climax in order.



Read,
Mark,
Learn.

We guarantee our Cross-cut Saws to do more work, day in and day out, the season through, than any other Saw in the market.

The test of practical experience has been applied, the verdict given,

the flat has gone forth, and the Humbugs are fast fizzling out, while our rapidly-increasing sales testify to the estimation in which these Saws are held.

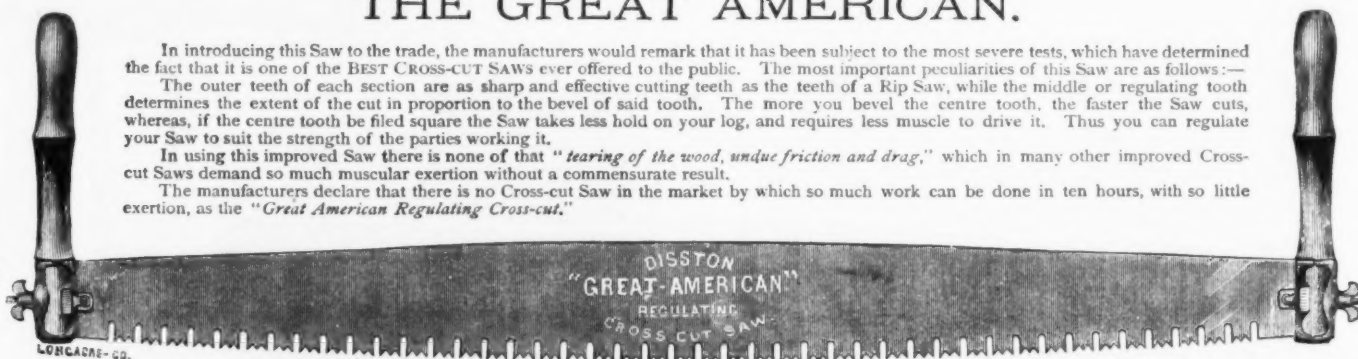
We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

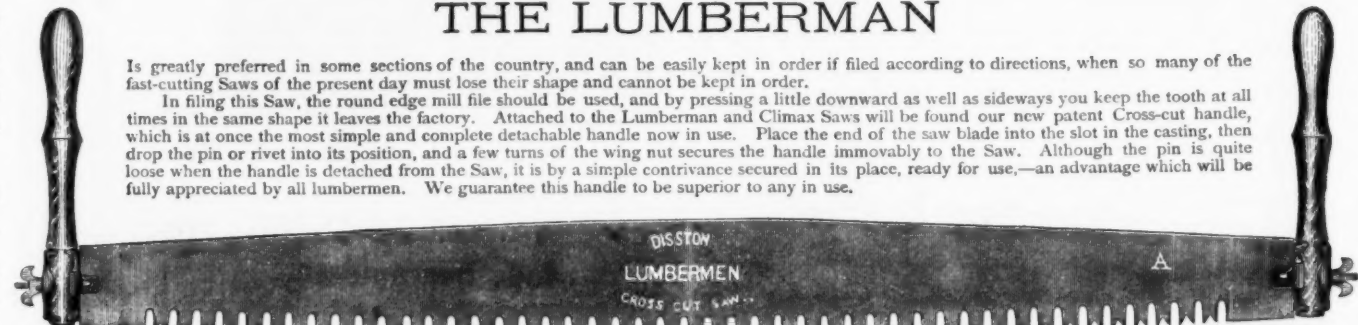
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

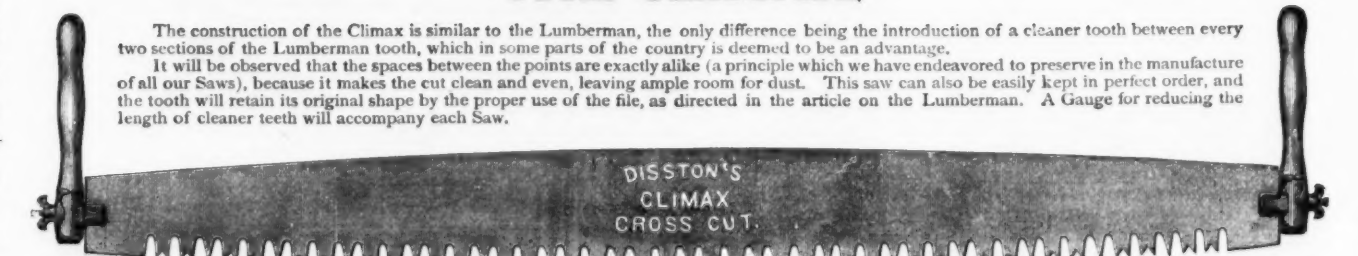
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

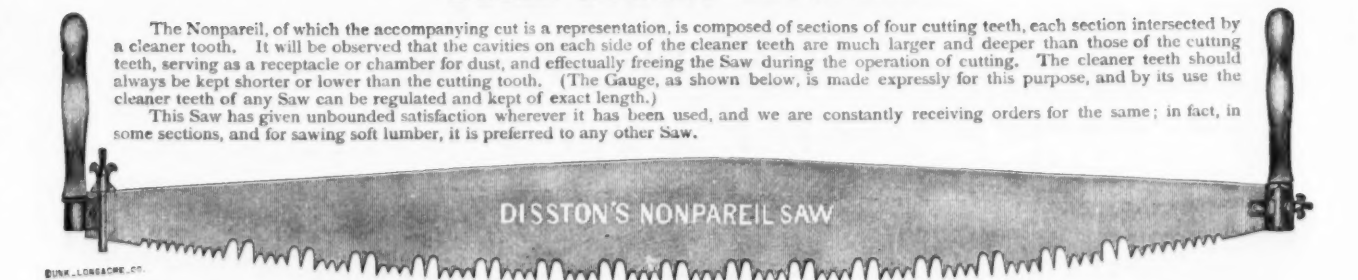
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



GAUGE FOR REGULATING CLEANING-TEETH.

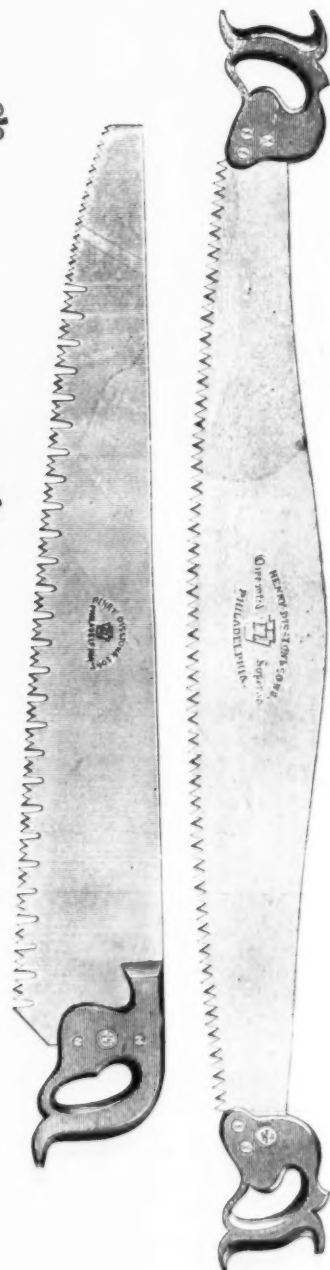
The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting-Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting-Teeth, the Cleaning-Teeth projecting through the opening in centre of Gauge. Reduce the projecting points by means of a File, until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by unskilled operator.



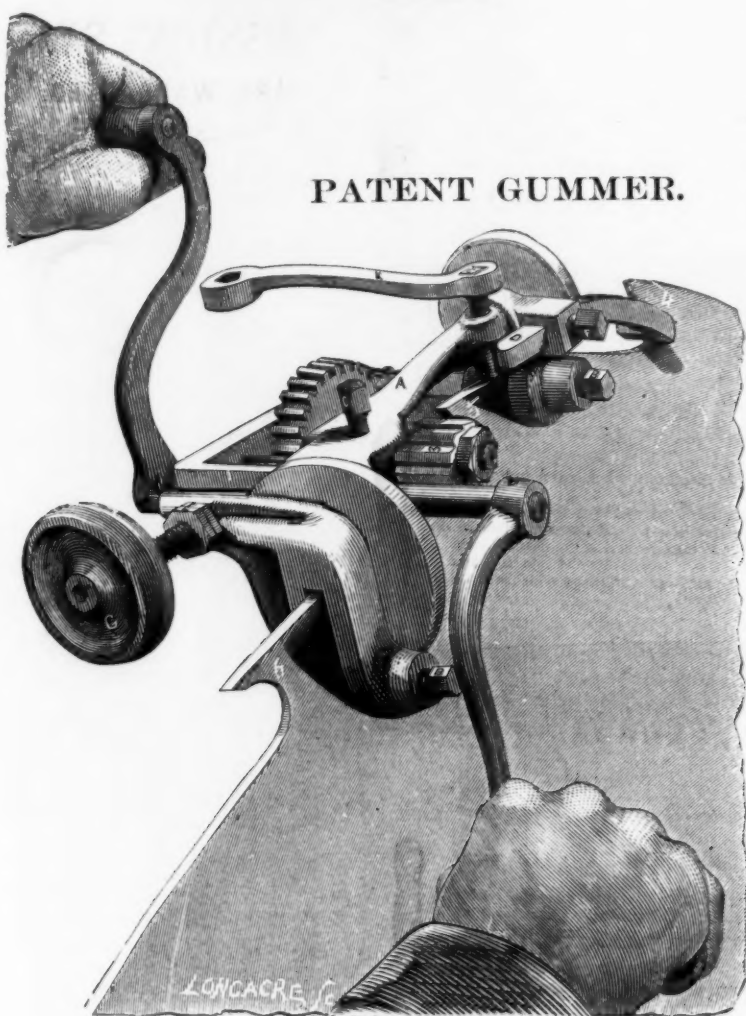
Showing the Gauge in Position for Filing the Cleaner-Tooth.

HENRY DISSTON & SONS.

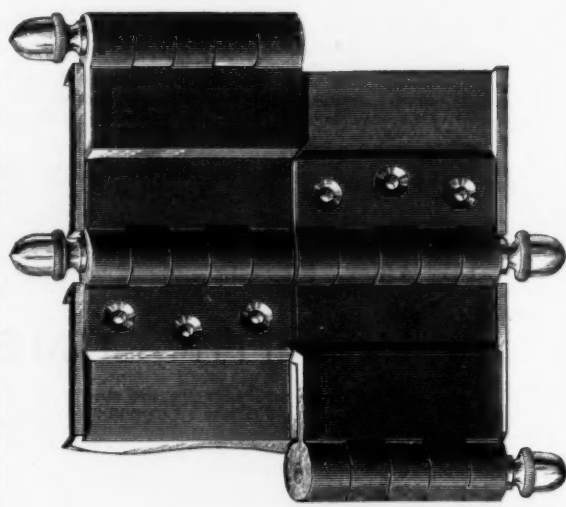
"DISSTON" SAWS
ARE WARRANTED.



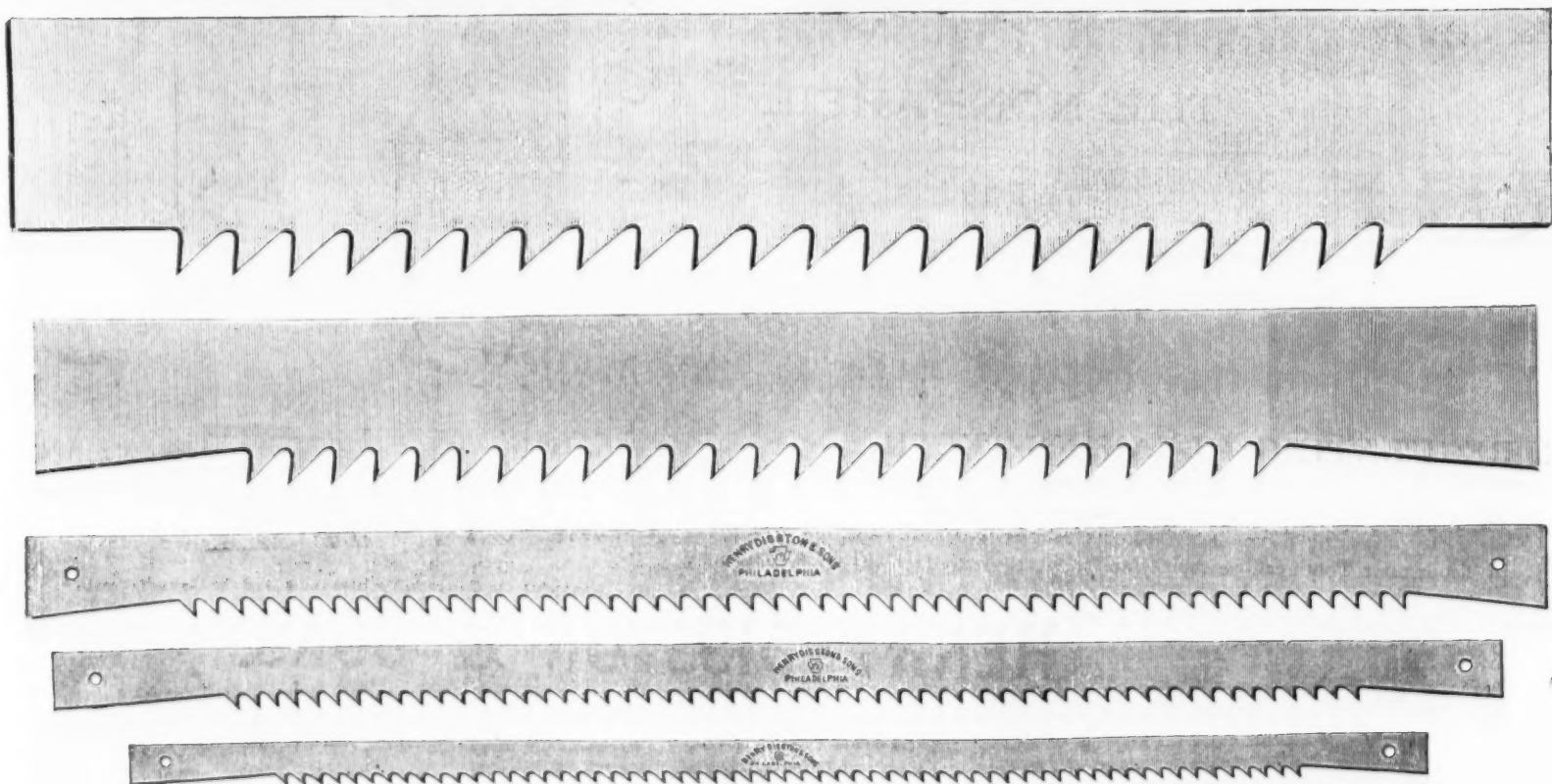
HENRY DISSTON & SONS' SQUARES, BEVELS, GAUGES, Etc.



BARKER'S DOUBLE REVERSE BUTT.



All goods marked "DISSTON" are fully guaranteed.



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| American Fire Co., Pawtucket, R. I. | 10 |
| Auburn Fire Works, Auburn, N. Y. | 10 |
| Barnett G. & H., 41 and 43 Richmond, Phila. | 24 |
| McClafferty & Bro., 173 and 174 N. 4th, Phila. | 24 |
| Nicholson Fire Co., Providence, R. I. | 10 |
| Wheeler, Clemons & Co., Middletown, N. Y. | 10 |
| Wash. Coulter & Flagler, 8 Chambers, N. Y. | 6 |
| Western Fire Works, Beaver Falls, Pa. | 8 |
| Fire Brick, Makers of. | |
| Brooklyn Clay Retort and Fire Brick Works, Van Dyke St., Brooklyn, N. Y. | 27 |
| Hall A. & Sons, Perth Amboy, N. J. | 27 |
| Hall A. & Sons, Buffalo, N. Y. | 27 |
| Kretschmer & Mable, Peekskill, N. Y. | 27 |
| Kretschmer & Son, 58 Goerck, N. Y. | 27 |

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|--|----|
| Newkumet Philip, 25d and Vine, Phila. | 27 |
| Newton & Co., Albany, N. Y. | 27 |
| Reed & Harbison, Pittsburgh, Pa. | 27 |
| Wason John R., Perth Amboy, N. J. | 27 |
| Fluting Machines. | |
| Myers Mfg. Co., 300 Centre, N. Y. | 7 |
| Flat and Emery Paper and Cloth. | |
| Reeder, Adamson & Co., 700 Market, Phila. | 11 |
| Founders and Machinists. | |
| Garrison A. & Co., Pittsburgh, Pa. | 4 |
| Galvanized Iron. | |
| Leitch Marshall Jr., 30 Beckman, N. Y. | 4 |
| Waltman S., Greenpoint, N. Y. | 4 |
| Giant Nail Extractor. | |
| Malby, Curtis & Co., Waterbury, Ct. | 12 |
| Glass, Importers of. | |
| Downey A. C. & Co., 57 Beckman, N. Y. | 33 |
| Governors. | |
| Boardman E. Palmer & Co., Lawrence, Mass. | 33 |
| Judson & Son, Rochester, N. Y. | 33 |
| Shive Governor Co., Bethlehem, Pa. | 33 |
| Grindstones. | |
| Wood Walter R., 283 and 285 Front, N. Y. | 36 |
| Worthington & Sons, North Amherst, O. | 36 |
| Guns, &c. | |
| Schroeder & Daly, 84 Chamber St. | 17 |
| Shover Edw. R., Jr., 19 N. Sixth, Philadelphia. | 17 |
| Windmiller Louis & Roelker, 30 Reade, N. Y. | 16 |
| Gunpowder, Makers of. | |
| Kneeland F. L., Duport, 70 Wall, N. Y. | 16 |
| John & Rand Powder Co., Park Road, N. Y. | 16 |
| Hammers, etc., Manufacturers of. | |
| Hammer Co., Brooklyn, E. D. N. Y. | 40 |
| Hammond H., Hartford, Conn. | 31 |
| Handles, Makers of. | |
| Rollins Handle Co., 105 Reade, N. Y. | 10 |
| Hardware, Brass and Goldsmiths. | |
| Tiebout W. & J., 200 Pearl, N. Y. | 2 |
| Hardware Wholesale Merchants. | |
| Forman & Son, 10 Chambers, N. Y. | 36 |
| Graham & Haines, 80 Chambers, N. Y. | 36 |
| Horton & Denckla, Phila. and N. Y. | 6 |
| Malby, Curtis & Co., 72 Reade, N. Y. | 6 |
| Watbridge G. B. & Co., 99 Chambers, N. Y. | 6 |
| Wash. Coulter & Flagler, 8 Chambers, N. Y. | 6 |
| Wilson J. Clark & Co., 81 Beckman, N. Y. | 30 |
| Hardware Dealers. | |
| Loyd, Supple & Co., 625 Market, Phila. | 10 |
| Quackenbush, Townsend & Co., 90 Reade, N. Y. | 10 |
| Shepard Sidney & Co., Buffalo, N. Y. | 10 |
| Wilson J. Clark & Co., 81 Beckman, N. Y. | 10 |
| Hardware Importers. | |
| King Hermann & Co., 101 Duane, N. Y. | 37 |
| Pratt & Co., 101 Duane, N. Y. | 37 |
| Briggs & Co., 101 Duane, N. Y. | 37 |
| Frith E. H., 101 Duane, N. Y. | 37 |
| Turner R. A., 101 Duane, N. Y. | 37 |
| Windmiller Louis & Roelker, 30 Reade, N. Y. | 37 |
| Hardware Manufacturers. | |
| Enterprise Mfg. Co., Phila. | 38 |
| Hart, Wilson & Co., 90 Chambers, N. Y. | 38 |
| Laurens Mill, Millbrook, N. Y. | 38 |
| Middleton Tool Co., 82 Chambers, N. Y. | 38 |
| Miller's Falls Mfg. Co., 70 Beckman, N. Y. | 38 |
| Pratt & Co., 101 Duane, N. Y. | 38 |
| Providence Tool Co., Providence, R. I. | 38 |
| Schwartz Mfg. Co., 37 Reade, N. Y. | 38 |
| Snatuck W. F. & Co., 113 Chambers, N. Y. | 38 |
| Stanley Works, 28 Chambers, N. Y. | 38 |
| Union Mfg. Co., 99 Chambers, N. Y. | 38 |
| William White & Co., 22 Warren, N. Y. | 38 |
| Wilson Mfg. Co., 37 Chambers, N. Y. | 38 |
| Hardware Specialties. | |
| Bratcher T. W. & Co., 112 Leonard, N. Y. | 39 |
| Brighton & Northrop, Rochelle, Ill. | 39 |
| Mark & Co., 139 Centre, N. Y. | 39 |
| Post C. C., Burlington, N. Y. | 39 |
| Pugley & Chapman, 610 N. Y. | 39 |
| Shepard Sidney & Co., Buffalo, N. Y. | 39 |
| Rogers H. C., Jordan, N. Y. | 39 |
| Hog Ringers, Manufacturers of. | |
| H. H. H. & Co., Decatur, Ill. | 18 |
| Holding Engines, Makers of. | |
| Howard Geo. C., 17 S. 18th, Philadelphia. | 43 |
| Osborne, 58 Broadway, N. Y. | 43 |
| Horse Hay Forks and Flakes, Makers of. | |
| Nellis, A. J. & Co., Pittsburgh, Pa. | 44 |
| House Nails, Makers of. | |
| Amable Horse Nail Co., 35 Chambers, N. Y. | 44 |
| Brundage & Co., Middletown, N. Y. | 44 |
| Gibbs & Co., 41 Chambers, N. Y. | 44 |
| Pratt & Co., Buffalo, N. Y. | 44 |
| Putnam S. S. & Co., Neponset, Mass. | 44 |
| Stanley Works, 28 Chambers, N. Y. | 44 |
| Union Mfg. Co., 99 Chambers, N. Y. | 44 |
| Horse Runging Goods. | |
| Bratcher T. W. & Co., 112 Leonard, N. Y. | 39 |
| Tim & Howard, 12 Murray, N. Y. | 39 |
| Hydraulic Jacks. | |
| Dudgeon Richard, 24 Columbia, N. Y. | 43 |
| Insurance, Boiler. | |
| Hartford Steam Boiler Inspection and Insurance Co. | 17 |
| Iron Brokers. | |
| Boynton Geo. A., 70 Wall, N. Y. | 4 |
| Crane U. O., 101 John, N. Y. | 4 |
| Hazen & Jones, 291 Pearl, N. Y. | 4 |
| Read & Dickey, Cleveland, O. | 4 |
| Iron, Carriage, Manufacturers of. | |
| Meely Iron Bridge, Cold Roof Co., Day, N. Y. | 4 |
| Quincy John W., 38 William, N. Y. | 4 |
| Iron, Carriage, Manufacturers of. | |
| Althous Geo. D., 341 Walnut, Philadelphia. | 5 |
| Justice Cox Jr. & Co., 333 Walnut, Phila. | 5 |
| Cott Edward W., 101 John, N. Y. | 5 |
| Conklin Henry, 14 John, N. Y. | 5 |
| Hall Jas. C. & Co., 614 and 616 Market, Phila. | 5 |
| Holmes & Co., 22 Dock, Phila. | 5 |
| Iron, Pig, Importers of. | |
| William James & Co., 69 Wall, N. Y. | 4 |
| Iron Dealers. | |
| Abel Brothers, 180 South, N. Y. | 4 |
| Bonnet Co., Rochester, N. Y. | 4 |
| Broder & Lovell, 70 and 71 West, N. Y. | 4 |
| Cleveland, Brown & Co., Cleveland, O. | 4 |
| Coddington T. R. & Co., 25 Cliff, N. Y. | 4 |
| Huerst G. J., 30 Market Slip, N. Y. | 4 |
| Fuller, Lord & Co., 120 Greenwich, N. Y. | 4 |
| Fuller, Lord & Co., 120 Greenwich, N. Y. | 4 |
| Gardner Wm., 313 Grand, N. Y. | 4 |
| Harrison & Gillson, 558 to 562 Water, N. Y. | 4 |
| Holmes & Co., 22 Dock, Phila. | 5 |
| Jackson & Chase, 308 and 306 Franklin, N. Y. | 7 |
| Judson B. F., 487 and 489 Water, N. Y. | 7 |
| Knuffel & Easer, 111 Fulton, N. Y. | 14 |
| Mohr J. J., Philadelphia. | 2 |
| Ogden Wallace, 512 Pearl, N. Y. | 4 |
| Pettie & Mann, 228 and 229 South, N. Y. | 4 |
| Pierston & Co., 51 Broadway, N. Y. | 4 |
| Quincy John W., 38 William, N. Y. | 4 |
| Richardson J. & Co., 59 Walnut, Philadelphia. | 4 |
| Snyder Asa, Richmond, Va. | 4 |
| Strom Wm., Lawrence, 104 John, N. Y. | 4 |
| Wash. Coulter & Flagler, 8 Chambers, N. Y. | 4 |
| Iron, Manufacturers of. | |
| Warner A. B. & Sons, 28 and 29 West, N. Y. | 4 |
| William James & Co., 69 Wall, N. Y. | 4 |
| Whitney A. B. & Sons, 85 Hudson, N. Y. | 4 |
| Iron, Manufacturers of. | |
| Burden Iron Works, Troy, N. Y. | 4 |
| Cleveland Rolling Mill Co., Cleveland, O. | 4 |
| Eastbrook Wm., 311 Cherry, Phila. | 7 |
| Girard Rolling Mill Co., Girard, O. | 4 |
| Leonard John, 400 and 401 West St., N. Y. | 4 |
| Millwright Iron Co., Millwright, N. Y. | 4 |
| Naylor & Co., 6 Oliver, Boston. | 4 |
| New Haven Rolling Mill Co., New Haven, Ct. | 4 |
| Northampton Iron Works, Northampton, Mass. | 4 |
| Oxford Iron Co., 81 Washington, N. Y. | 4 |
| Phoenix Iron Co., 410 Walnut, Phila. | 4 |
| Schoenberger & Co., Pittsburgh, Pa. | 4 |
| Taylor, Mitchell & Pond, Massillon, O. | 4 |
| Iron, Scrap, Importers of. | |
| Jessup Wm. & Sons, 31 and 31 John, N. Y. | 40 |
| Mittender Nils, 69 William, N. Y. | 4 |
| Norman & Co., Providence, R. I. | 4 |

THE LABOR MARKET

elsewhere is still feverish and unsettled. The following are items: North country blast furnaces reduced 10 per cent. (10,000 men); Cleveland iron miners, 12½ per cent. (8,000 men); West Cumberland miners on strike (2,000); Jarrow chemical workmen (2,000), drop of 15 per cent.; Durham miners to be reduced 10 per cent. (40,000 men or thereabouts); Tyne and Wear shipbuilders (8,000) resist reductions of 10 and 15 per cent. on time and piece wages; Northumberland miners (20,000) threaten not to accept the drop of 20 and 16 per cent. on soft and steam coal respectively; with many minor disputes and lockouts of engineers, fitters, smiths, &c., at Sheffield, Barrow, and elsewhere.

THE TRADE'S CONGRESS.

The annual congress of the trade's unions commenced this morning at Liverpool. There is a very large attendance of delegates from all parts of the Kingdom, but the chief business to-day is the presentation of credentials. Several interesting subjects will come up for discussion during the week.

EXPORTS OF COAL FROM LIVERPOOL.

At a meeting of the Mersey Harbor and Dock Board, held in Liverpool the other day, Mr. Forwood, one of the members, submitted returns giving particulars of the coal traffic at Liverpool. He did this in the following terms: "It appeared that whilst in 1862 the quantity of water-borne coal shipped at Liverpool and Birkenhead was 319,000 tons—namely, 388,000 tons at Birkenhead and 31,000 tons at Liverpool—the quantity shipped in 1874 was 1,040,000 tons at Birkenhead and 305,000 tons at Liverpool, making a total of 1,345,000 tons. The average quantity of coal shipped at Birkenhead from 1862 to 1866 was 400,000 tons per annum, and during the last four years the shipments at Birkenhead averaged 885,000 tons per annum, and at Liverpool 397,000 tons, making a total average of 1,282,000 tons. The total quantity shipped at Liverpool and Birkenhead from 1862 to 1866 was 540,000 tons. No trade had grown more rapidly, nor was there a trade more important to Liverpool. It had been stated that the board had not provided many new appliances during the last few years. Well, in 1868 the board provided two new types, and in 1871 they added appliances of the very best character, capable of working 500,000 tons. There was a great prejudice against shipping coal by machinery, on the ground that the coal was broken by this mode of shipment. In 1862, 106,000 tons were shipped by hand, and only 12,000 tons by machinery, whilst in 1874 there were shipped by hand 250,000 tons, and 636,000 by machinery. These figures showed a diminution of hand work, and that the shipment of coals by machinery was due entirely to the cessation of the prejudice that the machinery injured the coal. During the year, 4,000 coal flats had been in the river, and the board had received scarcely any dues from them. He was sorry to say that, unless the board took in hand some of the coal docks, the trade must soon come to a standstill. He believed that the only panacea for all the evils under which Birkenhead and Liverpool labored was the construction of the Mersey tunnel."

THE SCOTCH PIG IRON TRADE.

There has not been much business doing in warrants at Glasgow since the general resumption after the New Year's holidays. Prices have continued weak in consequence, and are now a couple of shillings lower than on the 1st inst. Makers' figures, on the other hand, have stiffened a little in several special instances—Coltness and Gartsherrie to wit, as samples. The total stock in Connal's stores now stands at 36,211 tons, against 40,886 at this time last year. There are 118 furnaces in blast—five less than at the corresponding period of 1874. Pig iron for ballast still stands at 60 per ton, and is not likely to be changed under the present aspect of affairs. Freight to New York are still 5/1, and to Boston 10/1 from Glasgow.

Writing on January 16th, Messrs. James Watson & Co. (Glasgow) say: "The market opened this week at 75/9, and gradually receded till 73/9 was touched on Wednesday, when a temporary improvement took place, but price has since given way, and closes this afternoon at 73/6. Shipments last week were 9139 tons, against 6458 tons in the corresponding week of 1874.

Messrs. John E. Swan & Bro.'s (Limited) prices current of the same place and date has the following information:

| Glasgow Brands. | Furnace, 18 in. dia. | Out 18 in. dia. | Furnace, 18 in. dia. | Out 18 in. dia. | Prices. |
|-------------------------------|----------------------|-----------------|----------------------|-----------------|-----------------------------|
| | | | | | No. 1. No. 2. No. 3. No. 4. |
| Gartsherrie..... | 11 | 5 | 16 | 91/ | 77/ |
| Coltness..... | 12 | 0 | 12 | 92/6 | 79/ |
| Summerlee..... | 6 | 2 | 1 | 92/ | 78/ |
| Langloan..... | 6 | 1 | 1 | 92/ | 78/ |
| Cambridge..... | 6 | 1 | 1 | 91/6 | 78/6 |
| Calder, at Port Dundas..... | 6 | 1 | 1 | 90/ | 75/ |
| Glenarnock, at Ardrossan..... | 6 | 1 | 1 | 90/ | 75/ |
| Eglinton..... | 6 | 1 | 1 | 90/ | 75/ |
| Dalmellington..... | 6 | 1 | 1 | 90/ | 75/ |
| Shotts, at Leith..... | 6 | 1 | 1 | 90/ | 75/ |
| Kinnell, at Byres..... | 6 | 1 | 1 | 90/ | 75/ |

* f. o. b. Glasgow, 1 per ton, extra.

Glasgow Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b., 73/6.

WEST COAST BRANDS—f. o. b. Ardrossan.

| | Furnace, 18 in. dia. | Out 18 in. dia. | Furnace, 18 in. dia. | Out 18 in. dia. | Prices. |
|--------------------|----------------------|-----------------|----------------------|-----------------|-----------------------------|
| | | | | | No. 1. No. 2. No. 3. No. 4. |
| Glenarnock..... | 7 | 2 | 9 | 87/6 | 78/ |
| Ardar..... | 4 | 1 | 5 | 87/6 | 78/ |
| Eglinton..... | 4 | 1 | 5 | 87/6 | 78/ |
| Luzar..... | 4 | 1 | 5 | 87/6 | 78/ |
| Muirkirk..... | 3 | 0 | 3 | 77/ | 75/ |
| Portland..... | 3 | 0 | 3 | 77/ | 75/ |
| Dalmellington..... | 6 | 1 | 5 | 81/ | 77/ |

EAST COAST BRANDS—f. o. b. in the Forth.

| | Furnace, 18 in. dia. | Out 18 in. dia. | Furnace, 18 in. dia. | Out 18 in. dia. | Prices. |
|------------------|----------------------|-----------------|----------------------|-----------------|-----------------------------|
| | | | | | No. 1. No. 2. No. 3. No. 4. |
| Kinnell..... | 3 | 1 | 4 | 85/ | 75/ |
| Almond..... | 2 | 1 | 3 | 77/6 | 75/ |
| Carron..... | 5 | 1 | 6 | 80/ | 77/6 |
| Lochness..... | 2 | 2 | 4 | 77/6 | 75/ |
| Lumphinnans..... | 0 | 2 | 2 | 75/ | 70/ |
| Bridgend..... | 0 | 2 | 2 | 75/ | 70/ |

ANOTHER BANKRUPT IRON COMPANY.

The North of England Hematite Iron Company, lately, however, known as the Lowther Hematite Iron Company, carrying on business at Workington, in Cumberland, has become impotent, and was the subject of an examination at Glasgow last week. Mr. David Doly, one of the proprietors, stated that the liabilities amounted to £124,989, and assets, £118,834, showing a deficiency of £6,155. He estimated the value of the works at £20,000, being £30,000 less than they cost. He was also individually liable to Barclay & Sons for £15,000. He had ar-

ranged to offer 20/ in the pound, but the arrangement had fallen through, the name of the firm having been changed, to prevent the quality and character of the iron being mistaken. It being better than the run iron in the North of England. A further examination will shortly take place.

UNFORTUNATE CO-OPERATIVE IRON WORKS.

Co-operation in the iron trade does not appear to be an untried success, if we may judge by the reports issued from time to time. Thus, for instance, the North of England Industrial Iron and Coal Company have just furnished the shareholders a report in which it is declared that they are again unable to declare a dividend. This unpleasant state of things they appear to lay to the charge of the Danks' puddling furnace, and the general stagnation of trade. To quote the report: "The company has blast furnaces, with a number of converted Danks' patent puddling furnaces, and a plate mill in course of erection at Carlton, and coal mines at East Howle, in the county of Durham, and ironstone mines at Ailsbury and South Belmont, in two different parts of Cleveland. Although the doom over-shadowing the iron trade has now extended to the coal trade, and different branches of business, the prospects of the company have much brightened of late, there now being a profit on the working of each department of business, and a prospect of increased prosperity on account of the more favorable price of raw material. The Hutton seam of coal, at East Howle colliery, has proved of excellent quality for household purposes, and the output of 200 tons per day meets ready sale; but additional capital is required to provide more house accommodation for the men, so as to increase the output and reduce the cost of production. The alteration and adaptation of the unprofitable Danks' puddling machine to Mr. Cramp-ton's patent system of heating is completed, a satisfactory trial of the machinery has been made, and the directors are sanguine of producing high-class iron from Cleveland pig. The whole of the foundations of the new plate mill are in, and most of the heavy machinery ready for erection, and it is expected this department will largely contribute to the prosperity of the company. Until recently, a loss has occurred from the working of the blast furnaces, in consequence of a serious deterioration in the quality of South Belmont ironstone, and the use of this stone will be abandoned at the close of the year, unless the royalty rent is altered to suit the altered circumstances of the stone. At Ailsbury mines a profitable return is made on the capital invested." The company also propose to issue £50,000 of new shares, to bear interest preferentially at the high rate of 10 per cent.

NORTH OF ENGLAND QUARTERLY MEETING.

The quarterly meeting of the Cleveland and North of England iron trade was held at Middlesbrough on Tuesday last. There was a good attendance. The tone of the market was decidedly weaker, but there was no reduction in prices. Very little iron changed hands. The rail iron trade continued excessively dull. Rather more was done in plate.

TRADES OF SHEFFIELD.

There is very little alteration to report in connection with any branch of the iron and steel trades. Generally speaking, there is a dull feeling in every branch of these industries, and no great amount of work is being turned out. The armor plate mills, forges and shops, continue to be well employed, and appear likely to remain so for almost any length of time. The Portuguese government has just ordered an armor plate frigate from the Thames Iron Works Company at a cost of £126,000 exclusive of machinery, and the Admiralty have contracted with two Clyde firms for two new armor plated vessels—so that a good deal of work would appear to be in store for this department of the two firms in the trade here.

There have been several transactions in pig iron during the past week, chiefly, however, in best forge and general foundry numbers. Hematite brands are held at about the following figures: Maryport "hematite" No. 4, 90/; No. 1, 95/; No. 2, 95/; No. 3, 95/; No. 4, 90/; M. and W. 90/; "Bessemer," No. 1, 100/; No. 2, 97/6; and 3, 95/ per ton, with the usual allowance for prompt cash. Millon "Bessemer," No. 1 is 95/; No. 2, 92/6; and No. 3, 90/; Millon "Ordinary," No. 3, 90/; No. 4, 80/6; No. 5, 87/6; M. and W. 105/; It is stated, however, that these figures can be considerably shaded by purchasers who are willing and able to take heavy lots or buy a little forward. Cleveland brands are easier on the average, No. 1 being 65/ and No. 3, 59/ per ton.

The returns giving details of the coal traffic during the year 1874 from Yorkshire and Derbyshire are now complete, but do not show to advantage as compared with the two preceding years. The total tonnage of coal from all districts by rail to London during last year was 4,689,786 tons, as against 5,147,413 in 1873, and 4,992,268 in 1872. Of the first given total the Midland carried 1,588,501; the London and North-western, 962,583; Great Northern, 872,649; and Great Eastern, 668,015 tons. The Great Northern alone thus fell off over 160,000 tons last year, the falling off being equally spread over the South and West Yorkshire colliery districts. During November, however, the Great Northern increased 29,000, and in December, 10,000 tons. The totals for the single month of December were: Midland, 138,755; London and North-western, 73,758; Great Northern, 108,217; and Great Eastern, 67,223 tons. The increase over the Great Northern principally originated with the South Yorkshire pits. The Derbyshire pits maintained their metropolitan connections very well during the year; Clay Cross certainly sent 16,000 tons less than in 1873, but Langley Mill increased 27,000 tons, these two collieries having dispatched 507,000 tons to London within the twelve months.

The Board of Trade, returns just issued for the past year, show the great extent to which our transactions in hardware and cutlery with the United States have fallen off during that period, but they also demonstrate very clearly the encouraging amount of business which we are doing with Australia, New Zealand, and other of the large colonies. On Tuesday a meeting of the riparian proprietors, mill owners and sundry public bodies interested in the river Don, was held at Sheffield, in order to consider the provisions sought to be put in force by the proposed River Don Protection Bill. This bill seeks to prevent the depositing of mechanical obstructions in the stream, with powers to the persons placing or causing such obstructions. It was stated that a staff of 30 men was constantly engaged in dredging the river at Tinsley, and that, if they relaxed their efforts for a few days, the bed became silted up. There were also 5 parts out of 100 of mineral matter held in suspension by the water—a much greater proportion than by the Irwell below Manchester, the Aire below Leeds, or the Clyde below Glasgow. It was resolved, after some discussion, to send a deputation to the Home Secretary, to invite the government to aid them (the meeting) in carrying out the objects of the bill by some general government measure.

The Sheffield branch of the Amalgamated Engineers' Society have decided to have lectures given to the members on the various higher branches of the business, including some on many interesting technical details and theoretical subjects.

It would appear to be practically impossible to inculcate upon miners and other underground workers in collieries, the great neces-

sity that exists for the use of naked lights being abandoned. An instance very forcibly illustrating this fact is supplied by a case which came before the Barnsley magistrates last week, only a few days after the second great explosion in this locality. In this case a number of men employed at the Darton Hall Colliery of Messrs. Thorp were summoned under the Masters and Servants Act for leaving notice, to work with lamps. The pit had previously been worked partly with naked lights, but a little gas having been detected, the management issued an order requiring nothing but lamps to be used. The men would not accede to this, unless they were paid at a higher rate! The bench ordered two of the defendants to pay 10/ each as compensation, and annulled the contracts, dismissing the cases against the other men.

The under noted are Messrs. Smith & Owens prices of Swedish charcoal iron and steel: "Swedish Charcoal Iron, &c.—To arrive from Sweden.—Rolled horse nail rods, ordinary sizes, squares, £17; ditto, rounds, £17. 10/; ditto, bar iron, ordinary sizes, 13-16 inch to 2 inch squares, 1 7-16 to 5 inch wide by 5-16 inch thick, or thicker, flats, £16. 10/; hammered bar iron, ordinary sizes, 1/2 inch to 2 inch squares, 1 11-16 inch to 5 inch wide by 7-16, 3/4 and 1/2 inch, also 1 1/2 by 3/4 and 1/2, and 1 1/2 by 1/2 inch flats, £17. 10/; ditto, superior quality for machine purposes, £18. 10/; ditto, short bar, 3 inch by 3/4 inch (80 to 90 bars per ton), £16. 5/; ditto, 8 inch by 3/4 inch, £16. 5/; (Brands suitable for Mediterranean markets). Keg steel, hammered, £20. 10/; ditto, rolled, £20. 10/; blooms, £11. 10/; billets, £14. 10/; pig iron, £5. 15/ per ton of 24 Swedish cwt.—20 cwt. English. Above prices ex-ship, Thames or Hull."

Messrs. J. H. Austin & Co.'s general rail prices circular gives these figures: "Rails.—American, 50 to 60 lb. per yard, £7 to £7. 5/ per ton, f. o. b. Wales; ditto, £7 to £7. 5/; f. o. b. Tyne and Tees. Russian and similar, 60 to 75 lb. per yard, £7. 5/; f. o. b. Wales; ditto £7 to £7. 10/; East Coast. Street rails, £7 to £7. 10/; ditto. Steel rails, £10. 10/ to £11. 15/ per ton, f. o. b. Wales; ditto, £10. 15/ to £11. 15/; f. o. b. Liverpool and Hull."

The local and other steel rail firms are at present dull, and not by any means well employed, but it is clear that they are making great efforts to regain lost customers, both in America and on the continent of Europe. They are now prepared to sell steel rails of ordinary sections at £9. 10/ to £9. 12/6 per ton, or in large lots at still less money.

The cutlery manufacturers are doing a pretty good business in best kinds of table knives, razors and special goods, but they are still unable to stimulate the sale of common articles. I hear that Joseph Rodgers & Sons are still pretty well engaged, and I also have heard a little whisper that the year's balance about to be declared will show the profits to have been over a thousand pounds higher than ever they have been previously. The file trade remains in a lithic condition.

WOLVERHAMPTON AND BIRMINGHAM QUARTERLIES.

Neither of these quarterly gatherings brought about the expected "drop" in prices—producers being particularly firm, and merchant buyers equally determined not to give out orders unless makers were prepared to concede at least £1 on finished iron. It became known early in the day that all the leading producers, both of pig and finished iron, had determined to make no reduction whatever in prices, alleging as a reason—or an excuse—that fuel was too dear to admit of any fall in quotations. Messrs. Barrows bars still, therefore, remain at £11, Eurl Dudleys at £11. 12/6, British Iron Company £11, and others at 12/6 per ton on finished iron. Sheet iron of superior quality was reported to be in very good request. The Hope Iron Company asked and still require £20 for their treble best sheets, £16 for Duchen sheets, and other best houses—such as Messrs. E. P. & W. Baldwin—were equally resolute. Ordinary singles were upheld at £13. Little or no business was done at these figures, but the middle class producers effected numerous transactions at prices which were fully £1, and even £1. 5/ per ton under the figures first given. It is, in consequence, fully anticipated that the first reduction in coal will bring about an official drop in finished iron. The Birmingham hardware houses are not very brisk, although it must be recorded that there is a steady call for edge tools, iron wire, keys and locks, brass ware, bedsteads and ordinary kitchen ware, as well as for bolts, nuts, wrought nails and steel pens. Brass and copper wire, brass sheets and tubes are a little easier to buy owing to the fall in copper.

TRADE OF SOUTH WALES.

Every thing is at a standstill in the principality, pending the settlement or enlargement of the strike. Dowdals is about the only establishment at which any iron is being produced. Some makers are understood to be offering Welsh iron rails, in London, at £6. 10/ per ton, but it is perfectly well known that it is utterly impossible to sell at that quotation without incurring a serious loss. Tin plates are firmly held. Thomas Webb, a South Wales coal owner, failed on Saturday with liabilities stated at £30,000.

THE METAL MARKETS.

There has been a fall in copper, of some little extent during the week, but the market is steady, and Straits are now quoted at £94. 10/ on the London metal exchange. Lead and spelter are quiet and, generally speaking, unaltered in price.

Messrs. Von Duesen & North's report is: "The metal market remains very quiet, and prices generally in buyers' favor. The bank rate was reduced yesterday to 4 per cent., but its effect is not yet apparent. There appears, however, to be a general apathy. Iron.—In Wales a serious conflict between masters and men seems inevitable—a lock-out now being threatened. The quarterly meetings are now over, and to the great disappointment of most people the makers of marked bars in Staffordshire made no reduction in price. Trade is very slack, but quotations are slightly higher for immediate delivery. Scotch pigs rather lower, closing at 74/6. The shipments last week were 9139 tons, against 6458 tons corresponding week 1874. Copper has relapsed to the price current before the Chili charters were known, sales from £84 to £82. 10/ having been reported in g. o. b. Chili, for cash. Australian quiet; £92. 10/ to £93 for Wallaroo; £91. 10/ Burra. A moderate business done in India sheet, at £95. 10/ to £96. English raw very flat. Tin.—Straits fell on Monday from £96 to £93. 10/; but has recovered during the week to £94. 10/; our present quotation for spot parcels; to arrive per steamer there are sellers at £94. Australian sold at £92. 10/ to £93. In Holland, Banca quoted 85/4; Bismarck, 56/; English obtainable at £100 to £101 for common ingots. Tin Plates very firm at the late advance, 28/ to 28. 6, f. o. b. here, for cokes. Lead rather dull; £23. 15/; Spelter.—No transactions reported. Sellers ask £24. 10/ for ordinary brands here; but from second hands output spelter is obtainable at 5/ to 10/ less. Quicksilver nominally £23. 15/ to £24."

The Mining Journal remarks: "Copper.—The market at the beginning of the week opened firm, and business in Chili bars was done for g. o. b. on usual cash terms, £84, and Urmeneta £84. 10/; Wallaroo realized £93, and Ingots £94, and India sheets £96; but as the week advanced the market became quiet, buyers retired

and quotations dropped. To-day there is no improvement to record, and until some new feature presents itself it is not likely that any material change will take place. Last year at this time, when stocks of Chili produce held in Liverpool and Swansea were about double what they now are, Chili bars were selling at £85 and upward. Should charters prove light, and supplies of copper from other sources not come forward in excess, copper ought to improve under the combined influence of cheap money and the approaching spring trade. Lead.—The tendency of the market is toward somewhat easier quotations, owing to the sluggishness of the demand, and good soft English pig is now obtainable at about £23. 10/ and soft Spanish £24. 15/. Zinc.—During the week 140 tons London rolled was reported to have been sold from £28. 15/ to £28. 12/6. Quicksilver.—This metal is not in active demand, the quotation remaining unaltered. Tin.—During the week the tendency of the market has been toward lower quotations. Straits sold at the beginning of the week at £93, cash, and afterward fell to

£94, from which there has been a slight improvement, and the tone is firmer. Australian, £93, cash. Tin Plates.—There is no change to report.

Latest Liverpool prices of iron and metals are:

| Iron: f. o. b. in Liverpool, per ton. | £ | s. | d. | £ | s. | d. |
|---------------------------------------|----|----|----|----|----|----|
| Merchant bar..... | 8 | 15 | 0 | 9 | 0 | 0 |
| Merchant bar, in Wales..... | 8 | 5 | 0 | 8 | 10 | 0 |
| Staffordshire..... | 9 | 5 | 0 | 11 | 15 | 0 |
| Hoop..... | 11 | 0 | 0 | 12 | 5 | 0 |
| Sheet..... | 12 | 0 | 0 | 13 | 10 | 0 |
| Nail rod..... | 10 | 0 | 0 | 10 | 10 | 0 |
| Bar, best crown..... | 9 | 5 | 0 | 9 | 10 | 0 |
| Boiler plates..... | 12 | 0 | 0 | 13 | 5 | 0 |

Tin Plates: f. o. b. in Liverpool, per box.

| | £ | s. | d. | £ | s. | d. |
|---------------------|---|----|-----|---|----|----|
| Charcoal, I. C..... | 1 | 16 | 0 @ | 1 | 18 | 0 |
| Coke, I. C..... | 1 | 8 | 0 @ | 1 | 10 | 0 |

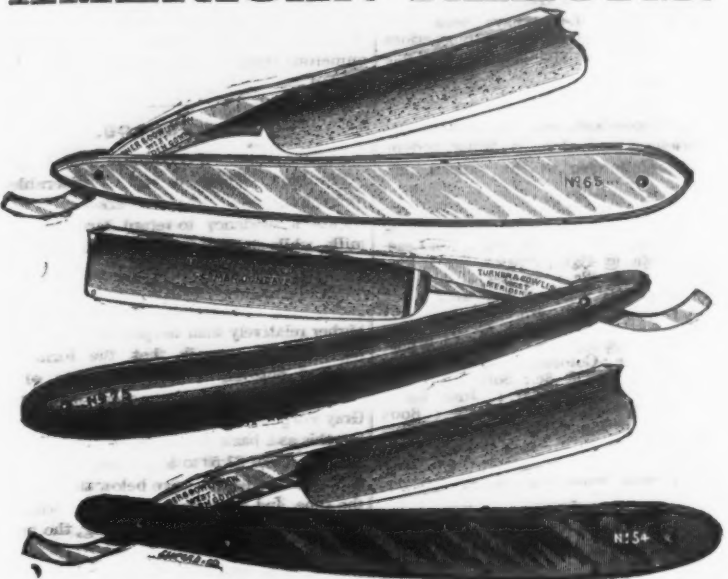
Copper: Delivered in Liverpool, per ton.

| £ | s. | d. | £ | s. | d. |
|-------------------------|-----|----|---|----|----|
| Bolt and Sheathing..... | 100 | 0 | 0 | 0 | 0 |
| Tin..... | 96 | 0 | 0 | 0 | 0 |
| Tough cake..... | 97 | 0 | 0 | 0 | 0 |
| Best selected..... | 99 | 0 | 0 | 0 | 0 |

J. CLARK WILSON & CO., 81 Beekman Street, N. Y.

Sole Agents for TURNER & COWLIHAW'S Celebrated

AMERICAN RAZORS.



EACH RAZOR WARRANTED.

We guarantee these Razors in style, finish and quality equal to the best imported.

| No. | Black Horn..... | Price List. | No. | Black Horn Hollow Ground..... | Price List. |
|-----|-----------------|-------------|-----|-------------------------------|-------------|
| 20 | " " | 7 25 | 20 | " " | 7 25 |
| 22 | " " | 7 25 | 22 | " " | 7 25 |
| 24 | " " | 7 25 | 24 | " " | 7 25 |
| 26 | " " | 7 25 | 26 | " " | 7 25 |
| 28 | " " | 7 25 | 28 | " " | 7 25 |
| 30 | " " | 7 25 | 30 | " " | 7 25 |
| 32 | " " | 7 25 | 32 | " " | 7 25 |
| 34 | " " | 7 25 | 34 | " " | 7 25 |
| 36 | " " | 7 25 | 36 | " " | 7 25 |
| 38 | " " | 7 25 | 38 | " " | 7 25 |
| 40 | " " | 7 25 | 40 | " " | 7 25 |
| 42 | " " | 7 25 | 42 | " " | 7 25 |
| 44 | " " | 7 25 | 44 | " " | 7 25 |
| 46 | " " | 7 25 | 46 | " " | 7 25 |
| 48 | " " | 7 25 | 48 | " " | 7 25 |
| 50 | " " | 7 25 | 50 | " " | 7 25 |
| 52 | " " | 7 25 | 52 | " " | 7 25 |
| 54 | " " | 7 25 | 54 | " " | 7 25 |
| 56 | " " | 7 25 | 56 | " " | 7 25 |
| 58 | " " | 7 25 | 58 | " " | 7 25 |
| 60 | " " | 7 25 | 60 | " " | 7 25 |

Discount to trade, 5 per cent.

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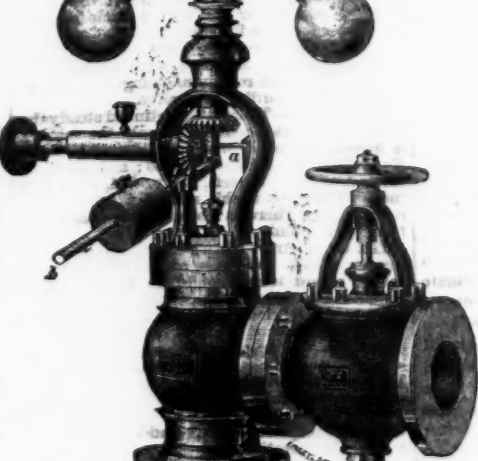
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THOMAS JOWITT & SONS, (Sheffield, England.) Celebrated FILES AND HORSE RASPS. Rough and Ready and CLIPPER SCYTHES, Warranted. And Exclusive Manufacturers of the "BEAVER" (American) FILES AND HORSE RASPS. "WIDE AWAKE" AXES.



JUDSON PATENT IMPROVED GOVERNORS.

When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Black, Finished or Portable, as you may require, and with or without Lever Attachment. For dimensions and other particulars send for Illustrated List.



| Capacity of Valve or Diameter of Steam Pipe in inches. | Price, Black. | Price, Bright Finish. | Price, Portable. | Price of Lever Attachment for altering speed. | Price of Stop Valve. |
|--|---------------|-----------------------|------------------|---|----------------------|
| $\frac{3}{4}$ | 18 00 | 20 00 | 17 00 | .. | .. |
| 1 | 20 00 | 22 00 | 19 00 | .. | .. |
| $1\frac{1}{2}$ | 24 00 | 27 00 | 22 00 | 2 00 | 5 25 |
| $2\frac{1}{2}$ | 29 00 | 32 00 | 27 00 | 2 25 | 6 50 |
| 3 | 34 00 | 38 00 | 31 00 | 2 50 | 8 50 |
| $3\frac{1}{2}$ | 41 00 | 46 00 | 38 00 | 3 25 | 11 50 |
| 4 | 47 00 | 54 00 | | 3 25 | 16 00 |
| $4\frac{1}{2}$ | 50 00 | 57 00 | 47 00 | 3 50 | 17 00 |
| 5 | 55 00 | 62 00 | | 3 75 | 19 00 |
| $5\frac{1}{2}$ | 62 00 | 70 00 | | 4 25 | 22 00 |
| 6 | 71 00 | 80 00 | | 4 50 | 27 00 |
| $6\frac{1}{2}$ | 81 00 | 92 00 | | 5 00 | 32 00 |
| 7 | 92 00 | 103 00 | | 5 50 | 37 00 |
| $7\frac{1}{2}$ | 102 00 | 114 00 | | 6 00 | 42 00 |
| 8 | 116 00 | 129 00 | | 6 50 | 48 00 |
| $8\frac{1}{2}$ | 134 00 | 148 00 | | 7 00 | 55 00 |
| 9 | 160 00 | 176 00 | | 8 00 | 65 00 |
| $9\frac{1}{2}$ | 199 00 | 219 00 | | 9 00 | 83 00 |
| 10 | 230 00 | 255 00 | | 10 00 | .. |

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 FOR ROPE OR CHAIN.



SNATCH NP 2 NP 3 NP 4 NP 5 NP 6 CIN BLOCK

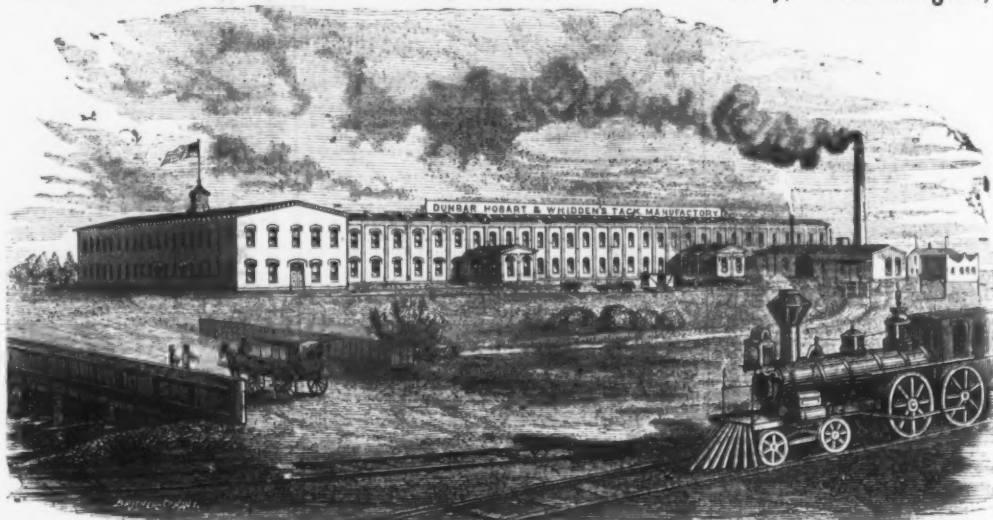
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IT SHEARS CLEAN,
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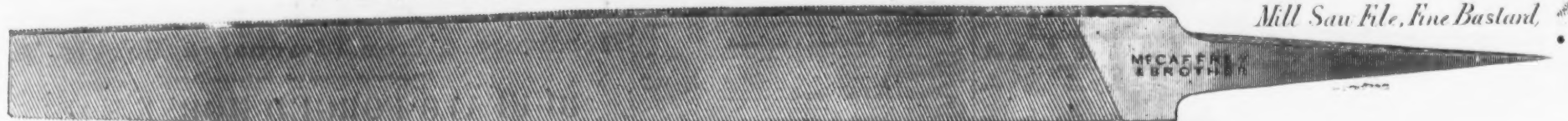
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HARDWARE.

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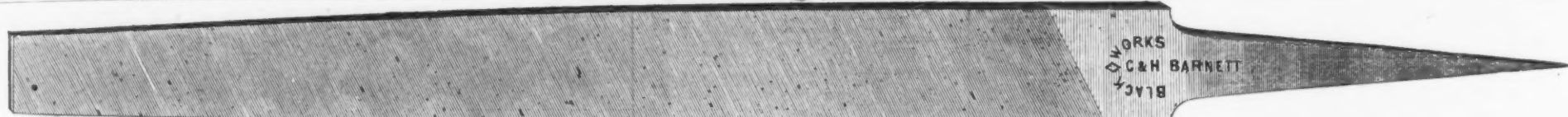
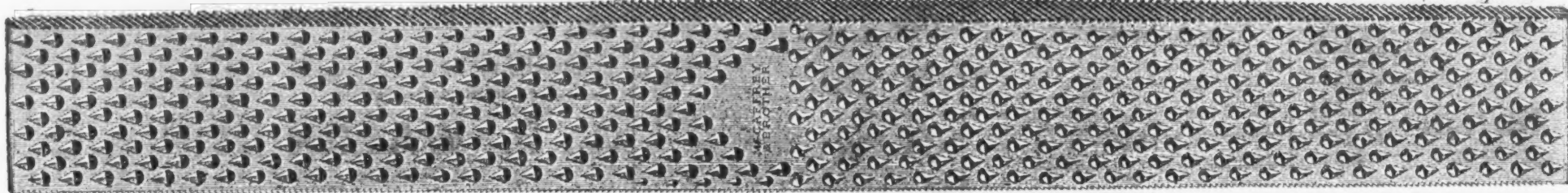
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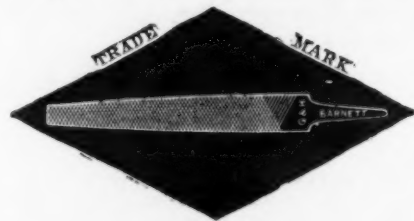
Double Horse Rasp.



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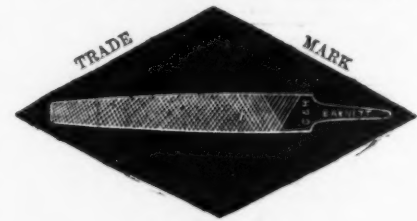
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G. & H. BARNETT,

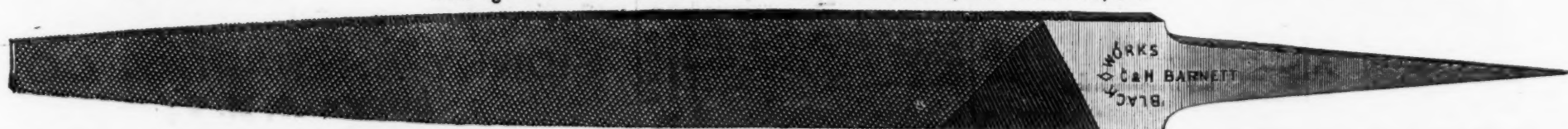
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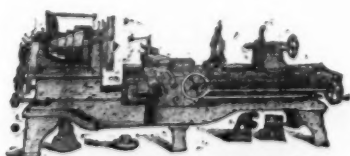
| FAMILY SIZES. | Size of Roll. | | Retail Prices. | Wholesale Prices. |
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| | Length. | Diameter. | | |
| No. 2, "XX" Family Size, Cogs on both ends. | 10 in. | 1 1/2 in. | \$8 00 | \$64 00 |
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| " 1 1/2, Extra, | 11 in. | 1 1/2 in. | 9 00 | 72 00 |
| HOTEL SIZES. | | | | |
| No. 1, (Usual) | 12 in. | 1 1/2 in. | 12 00 | 96 00 |
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| Family Size | Retail | 1 doz. or less. | Each. |
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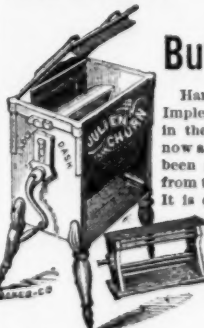
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It is correct in principle, and
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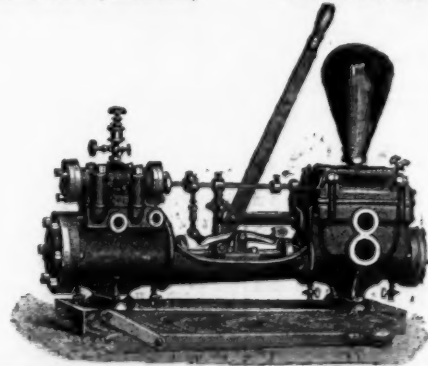
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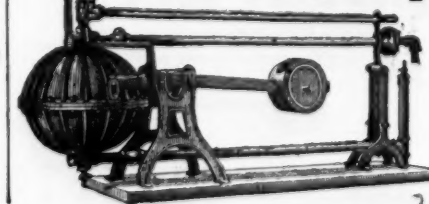


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This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to:

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THE CHERRY-HEAT WELDING COMPOUND.



Silver Medal of the American Institute.



Awarded November 21st, 1874.

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The subscriber in bringing the CHERRY-HEAT WELDING COMPOUND to the notice of the iron trades, offers an article which is not only cheaper than any flux or welding compound hitherto employed in welding irons and steels, but which accomplishes with rapidity and certainty results never before attempted, and hitherto regarded as impossible of accomplishment. It is of indispensable utility in all establishments where iron and steel are forged, whether on a large or small scale. It perfectly unites IRON to IRON, IRON to STEEL, STEEL to STEEL, WROUGHT IRON or STEEL to CAST IRON, and IRON or STEEL to BESSEMER METAL, without requiring the parts welded to be brought above a CHERRY RED HEAT, and effecting a great saving in fuel over all other welding compounds or fluxes, which require the metals to be brought to a white heat. In its operation it is wholly unlike borax, and those who have used it, or witnessed experiments with it, pronounce it the most remarkable welding flux ever discovered.

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The CHERRY-HEAT WELDING COMPOUND is of great value in improving the quality and temper of steel. A bar of common steel, a tool spring or blade, heated to redness, sprinkled with the CHERRY-HEAT WELDING COMPOUND, and then brought to a white heat, will take and retain a high temper with or without subsequent hammering. Steel injured by overheating, whether it has merely lost its tempering qualities or been burned to a cinder, is at once restored to its original homogeneity and quality by sprinkling it with the CHERRY-HEAT WELDING COMPOUND, bringing it to a white heat, and hammering it into the required shape.

Its Utility in Improving the Quality and Fluidity of Cast Iron.

When mixed with cast iron in the ladle, in the proportion of five ounces of the CHERRY-HEAT WELDING COMPOUND to one hundred pounds of iron, castings can be made from common mixed scrap (No. 3) which equal in smoothness and finish castings made from the best grades of Scotch pig, and in strength and toughness castings made from a good quality of cold blast charcoal iron. Samples broken from two castings made from No. 3 scrap, tested by Prof. R. H. Thurston, at the Mechanical Laboratory of the Stevens Institute of Technology, Hoboken, N. J., were found to have an ultimate strength of 34,800 and 34,500 pounds to the square inch, respectively. This gives the Cherry-Heat welding a great value for employment in all departments of foundry work, especially car wheel, stove and hollow ware manufacture.

The subscriber is well aware that testimonials attesting the value of any article, however worthless, can be obtained with little trouble from irresponsible persons, and that the public are often misled by such testimonials. He is confident, however, that no article not possessing great economic value ever received such hearty and unqualified commendation from gentlemen well known in the iron trades, as the CHERRY-HEAT WELDING COMPOUND. The following may be pronounced the most remarkable array of testimonials ever presented in support of an inventor's claims:

TESTIMONIALS.

OFFICE OF TERWILLIGER & Co.,
Patentees and Manufacturers of Welded Steel
and Iron Fire and Burglar Proof Safes,
DEPT. 100 MAIDEN LANE,
NEW YORK, April 9th, 1874.
Mr. H. SCHIERLOH, 24 Exchange Place, Jersey City:
DEAR SIR—We take great pleasure in stating to you that we have thoroughly tried and tested your Welding Compound, and are frank to say that it is the best welding material we have ever used, and surpasses, in our opinion, all you have ever said of it by way of recommendation. Yours, respectfully,
TERWILLIGER & CO.

OFFICE OF BENJAMIN ATHA & Co.,
Manufacturers of Hammered and Rolled Cast Steel,
on Pacific River, Foot East River Street,
NEWARK, N. J., April 14th, 1874.
Mr. H. SCHIERLOH, Jersey City, N. J.: DEAR SIR—We take pleasure in recommending your Cherry Heat Welding Compound to all persons engaged in the manufacture of welded iron and steel. We have given it a good trial, and find that perfectly sound and good welds can be made with it at a cherry heat, thus saving time to the forger, and also preserving the quality of the steel. Yours, respectfully,
BENJAMIN ATHA & CO.

OFFICE OF THE WASHOR TOOL MFG. CO.,
ELM PARK, STATEN ISLAND, Apr. 30, 1874.
Mr. H. SCHIERLOH, 24 Exchange Place, Jersey City, N. J.: DEAR SIR—It gives me pleasure to say that I have thoroughly tested your Welding Compound, and find it fully comes up to all requirements in welding iron and steel, and does all you claim for it. I have no hesitancy in recommending it to all parties requiring a welding compound, both in regard to its making a good weld and the economy over ordinary borax. Yours, truly,
JOHN S. NEYLE, Sup't.

OFFICE AND WORKS, KENT AVE., COR. OF
KEEF ST., BROOKLYN, E. D., N. Y.,
CHROME STEEL CO.,
Manufacturers of all descriptions of Cast Steel,
June 4th, 1874.
H. SCHIERLOH, Esq., 24 Exchange Place, Jersey City, N. J.: DEAR SIR—We have tested your "Cherry Heat Welding Compound," and find it to be all you represent, and can cheerfully recommend it to any one in need of such an article. Yours, truly,
CHROME STEEL CO.

D. D. GAUTIER & Co.,
JERSEY CITY, N. J., August 1, 1874.
Mr. H. SCHIERLOH: DEAR SIR—Your welding compound gives us perfect satisfaction. Yours, truly,
D. D. GAUTIER & Co.

OFFICE OF CYRUS CURRIER, 21 Railroad Pl.,
Builder of Steam Engines, Fourdrinier and Cylinder
Paper Machines, Sole Manufacturer of King-
land's Patent Bag Engine and Stiff Pump,
and Machinery in general,
NEWARK, N. J., May 12th, 1874.
H. SCHIERLOH, Esq.: DEAR SIR—After having given your Welding Compound a thorough trial or all work where such an article would be of use in our shops, we take pleasure in adding our recommendation to the many others that you have received. In some cases, after making a weld, I have found the steel to be greatly improved by the use of your compound. Yours, truly,
CYRUS CURRIER.

PATERSON, June 18th, 1874.
Mr. H. SCHIERLOH: DEAR SIR—We have given your compound for welding steel, wrought iron, and cast iron, a trial, and find it equal to your recommendation in all respects. Respectfully,
W. W. FAIRBANKS, Sup't.

OFFICE OF CYRUS CURRIER, 21 Railroad Pl.,
Builder of Steam Engines, Fourdrinier and Cylinder
Paper Machines, Sole Manufacturer of King-
land's Patent Bag Engine and Stiff Pump,
and Machinery in general,
NEWARK, N. J., September 30th, 1874.
H. SCHIERLOH, Esq.: DEAR SIR—Sent you yesterday per express a short wrought iron knife laid with steel. We have a great many similar knives to make for paper mill work, and find your compound just what is needed in making these long welds. Most of the knives we make are much longer than the one sent you. In addition to the welds being more perfect, our work is very materially facilitated by the use of your compound. A short time since, we had some very heavy knives to make for breaking stone, in the welding of which we anticipated much trouble; but by using your compound we secured perfect welds and without any trouble whatever. Yours, respectfully,
CYRUS CURRIER.

OFFICE OF TERWILLIGER & Co.,
Patentees and Manufacturers of Welded Steel
and Iron Fire and Burglar Proof Safes,
DEPT. 100 MAIDEN LANE,
NEW YORK, Sept. 21st, 1874.
H. SCHIERLOH, Esq.: DEAR SIR—The samples you received from us are welded with your Welding Compound. We have now used over 1000 pounds in welding plates of iron and steel, our plates being in some cases twenty-one inches wide and from (14 to 16) fourteen to sixteen feet long, and we can cheerfully recommend its use to our friends and the public. Yours, respectfully,
TERWILLIGER & CO.

OFFICE OF THE CRANE IRON WORKS,
CATASAUQUA, Pa., Sept. 3d, 1874.
H. SCHIERLOH, Esq.: DEAR SIR— * * * I got your compound to use in steeling the points and angles of railway crossings, of which we have quite a number, and we found we thus ran no risk of burning the steel when welding on the iron. I also tested the compound by cutting a steel bar and welding it again, and using it as a chisel, found the steel as good as before. Other tests of wrought and cast iron, &c., were made, and, as a result, both our foreman of shops and myself were very much pleased with it. I would therefore cordially recommend its use, for welding purposes, to blacksmiths and others. * * * Yours, truly,
JOSEPH HUNT, Asst. Sup't.

OFFICE OF DELAMATER IRON WORKS,
Foot of West Thirtieth Street,
NEW YORK, July 13, 1874.
Mr. H. SCHIERLOH, 24 Exchange Place, Jersey City, N. J.: DEAR SIR—We have given your "Cherry Heat Welding Compound," a very thorough trial, and find it so good that we will adopt it altogether for welding purposes, and dispense with the use of borax entirely. Yours, respectfully,
JAMES MILLER, Supt.

No. 141 RAYMOND STREET,
BROOKLYN, N. Y., September 26th, 1874.
H. SCHIERLOH, Esq.: DEAR SIR—I find that rock drills and mill picks are welded with your "Cherry Heat Welding Compound," with less trouble and better effect, as regards quality, than if we had used borax. In fact, we have discarded borax entirely, finding your compound superior in welding either iron or steel. Yours, respectfully,
S. S. POLLARD.

DELAWARE, LACKAWANNA & WESTERN
R. R. Co., Morris and Essex Shops,
HOBOKEN, N. J., June 10th, 1874.
H. SCHIERLOH, Esq.: DEAR SIR—We have given your compound a thorough practical test in welding, and found it to be the best welding compound that I have ever used. Yours, truly,
WM. H. LEWIS.

JAMES R. THOMPSON & Co.,
Jersey City Steel Works, Manufacturers of
Cast Steel of all Descriptions,
JERSEY CITY, May 31, 1874.
H. SCHIERLOH, Esq.: DEAR SIR—We have made several tests of your Welding Compound, and find it everything that is claimed for it, being superior to borax for welding purposes, and take great pleasure in recommending same to general use. Yours, respectfully,
JAMES R. THOMPSON & CO.

OFFICE OF THE TRENTON VISE AND TOOL
WORKS,
TRENTON, N. J., April 10th, 1874.
Mr. H. SCHIERLOH, 24 Exchange Place, Jersey City, N. J.: DEAR SIR—I have tried your Welding Compound very thoroughly, and find it is all that you claim for it, and have no hesitancy in recommending it to all persons engaged in the manufacture of articles composed of welded steel and iron. Perfectly sound and good welds can be made at a "cherry heat," thus preserving the quality of the steel, and saving much time to the forger. From the experiments made in our works, I judge that there is a saving in quantity used over borax of about 33 per cent. Yours, respectfully,
J. HOWARD MURRAY, Sup't.

PHILLIPSBURG MANUFACTURING COMPANY,
Manufacturers of Bolts and Nuts, Builders of
Iron Bridges, Viaducts and Roofs. New
York Office, 23 Ely Street.
PHILLIPSBURG, N. J., June 24, 1874.
H. SCHIERLOH, Esq.: DEAR SIR—I have tried your Welding Compound with very gratifying results. Its action in aiding the welding operation between iron and steel surfaces is extraordinary, comparing it with any other material or compound I have previously used. I cannot be called a simple substitute for borax, because its action seems to be different from that, or any of the ordinary fluxes used to protect highly-heated metallic surfaces during the welding process. The low temperature at which it allows welds to be made being one of its most peculiar and valuable features. I cheerfully recommend it for the object you claim. Yours, truly,
JAMES CHRISTIE, Supt.

NEW YORK, June 10th, 1874.
Mr. H. SCHIERLOH: DEAR SIR—I take pleasure in stating that we have tried your welding compound, and say that it is the best welding material we have so far used. S. V. CROLIUS,
Foreman Smith Shop,
DELAWARE IRON WORKS.

NAVY YARD, NEW YORK, July 22, 1874.
SIR—We have obeyed your order of the 10th inst., relative to testing the merits of Mr. H. Schierloh's "Cherry Heat Welding Compound," and have the honor to report as follows: For welding steel and iron it possesses great superiority over the ordinary method, in the fact that the union of the two metals can be perfected at a much lower heat, thus avoiding the danger or liability of burning and destroy-

ing the steel, which is of frequent occurrence with the old method; again, as the welding can be accomplished at a much lower heat, there must necessarily be a considerable and valuable saving in time over the ordinary method of taking a welding heat. In welding iron to iron its importance is not so conspicuous. The cost of the new compound, or flux, is some twenty-five per cent. cheaper than borax; which is commonly used for the purpose. Respectfully submitted,
GEO. SEWELL, Chief Engineer, U. S. N.
W. L. HANSCOM, Naval Constructor, U. S. N.
DANIEL HERRICK, Foreman Shipsmith,
To Vice-Admiral S. C. Rowan, U. S. N., Commanding New York Station.

Vice-Admiral's Office, Navy Yard, N. Y. Approved July 22, 1874.
R. W. SHUFELDT, Captain Commanding.

BUSH HILL IRON WORKS,
PHILADELPHIA, August 19th, 1874.
H. SCHIERLOH, Esq.: * * * I have used your compound and find it to excel anything ever used about the smith shop. ANTON GERBER,
Foreman Boiler and Smith Shop,
JAMES MOORE, per STINSON.

OFFICE OF THE CONTINENTAL WORKS,
GREENPOINT, N. Y., August 24th, 1874.
Mr. H. SCHIERLOH, 24 Exchange Place, Jersey City, N. J.: DEAR SIR—As you desired, I have tried your compound for welding iron to steel, and find it excels anything I ever used for the purpose. AUGUS. McLAHLAN,
Foreman Continental Works, Greenpoint, N. Y.

OFFICE OF WILLIAM C. CLARY,
Practical Engineer and Machinist,
Foot of Essex St., and 78 & 80 Hudson St.,
JERSEY CITY, October 1st, 1874.
Mr. H. SCHIERLOH: DEAR SIR—I have been using now your Cherry Heat Welding Compound in my shop for 3 months, and feel confident to say that it is the best for the purpose, and especially for rock drills, steel rods, and in fact for welding all kinds of steel. It has ever since enabled me to dispense entirely with the use of borax. Yours, truly,
WILLIAM C. CLARY.

NEW YORK, Jan. 22d, 1875.
Mr. H. SCHIERLOH: DEAR SIR—After giving your Welding Compound the most severe and critical practical tests, I am thoroughly convinced that it has neither equal nor superior as a flux for welding steel tires. Truly, yours,
J. L. H. MOSIER, Foreman Smith Shop,
BREWSTER & Co., Broadway and 47th St., N. Y.

Directions for Use.

In tests of the CHERRY-HEAT WELDING COMPOUND, which manufacturers in all branches of the iron trades are cordially invited to have made in their own workshops, and by their own mechanics, care should be taken that it is used as directed. The function of borax is merely to protect steel against burning while being brought to the white or welding heat; the CHERRY-HEAT WELDING COMPOUND enables the weld to be made at a bright cherry-red heat, at which temperature steel requires no protection against burning. When a higher temperature is required, and the CHERRY-HEAT WELDING COMPOUND is used as borax is commonly employed, steel of any quality can be brought to snowball heat without the least danger of injuring it. It is used as follows:

To Weld Wrought Iron, Cast Iron, or Cast, Blister and Bessemer Steel.—Dust or sprinkle a thin layer of the compound on one of the surfaces to be welded, and lay the other surface upon it, so that the compound shall be evenly distributed between them. The pieces to be welded are then placed in the fire in such a position that the compound, when fluxed by the action of the heat, shall not run out. When brought to a bright cherry-red they are taken out and hammered or rolled together. In welding iron to steel, or steel to steel, on an anvil, it is best to hold a flat hammer on the steel and strike very lightly at first, as nearly all steel is apt to jump at such a low heat, when any but a flat and even blow is struck. When the welding is done under a drop or steam hammer, there is no necessity for especial care, as such blows are always regular; but the first two or three need to be light. After that the metal may be drawn down or worked into any desired shape, without the least danger of starting the weld. In inserting steel into iron, as in the manufacture of axes, the steel may be put in cold after the iron has been opened and the cleft sprinkled with the compound. After the steel is inserted the seam should be closed up as tight as possible, and the article held in the fire until brought to a red heat, in such a position that the compound cannot readily run out when fused. The compound should be distributed as evenly as may be convenient, with the hand or with a dredging box.

To Improve the Quality and Temper of Steel.—Heat to a dull red, sprinkle with the compound, heat to bright cherry, sprinkle a second time, and raise to white heat. The tool or bar may then be tempered by sudden plunging into cold water without care.

To Restore Burnt Steel.—The method employed in restoring burnt steel is the same as described in the preceding paragraph, except that hammering is necessary to restore the homogeneity of the metal.

To Improve and Strengthen Cast Iron.—Place the compound in the ladle in the proportions of about five ounces of the compound to one hundred pounds of iron, and run the iron in upon it. No stirring is necessary. When the ebullition ceases skim off the impurities, and pour as usual. The castings are invariably perfect and free from air bubbles. They may be chilled like car wheels.

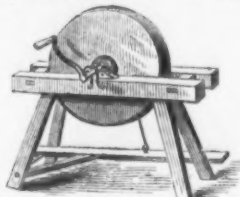
To Improve Cast Steel.—Sprinkle the compound on the molten cast steel, in the crucible, in the proportion of four ounces to the hundred pounds of metal. When the ebullition ceases skim and pour. The advertiser will conduct at his own expense, at any time and place which may be mutually convenient, such tests as may be considered necessary to show the value of the CHERRY-HEAT WELDING COMPOUND for any of the uses above described. He also desires that all who are interested in the subject shall test it in their own way, and solicits no order until after a trial has been made and satisfaction given. In no shop in which it has been introduced has it been discarded, or borax and other welding fluxes substituted for it. In every blacksmith shop, forge and rolling-mill, where welds of iron, puddle, blister and cast steel, and Bessemer metal are made to themselves, to each other or to cast iron (something never before attempted or deemed possible), and in every foundry, machine shop and crucible steel works, THE CHERRY-HEAT WELDING COMPOUND will be found of immediate and permanent utility. Those who have been unsuccessful in their experiments with the CHERRY-HEAT WELDING COMPOUND, are requested to communicate with the subscriber, who will take pleasure in explaining its use. It cannot fail when used properly. It is manufactured under the inventor's personal supervision, and is sold and warranted genuine under the above trade mark, in 5, 10, 50, and 100 lb. packages. Price for 5 and 10 lb. packages, 30 cents per lb.; for 50 and 100 lb. packages, 25 cents per lb. Samples sent on order.

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Light equal to gas. Adapted to Dwellings, Churches, Factories or Public Buildings. It will burn for one year. Every Lamp is warranted for one year. Liberal Refunds made for unsatisfactory results.
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We invite the particular attention of the trade to our New Straight Bar Wrench, *acidened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

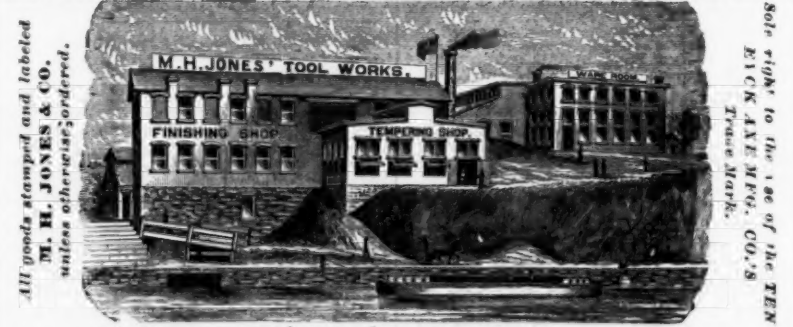
We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the *Genuine Wrench* by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark. We would caution them against imitations. None genuine unless stamped

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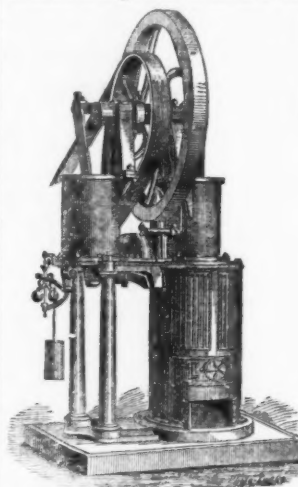
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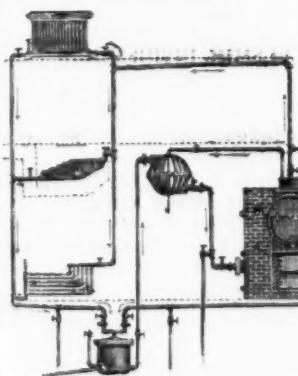
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SELF-LUBRICATIVE****Piston Packing Hemp**

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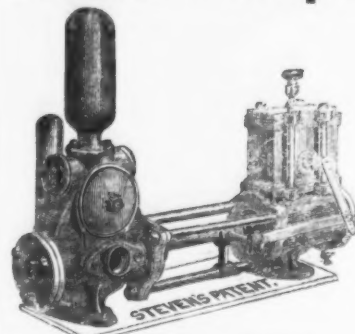
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of that class in which the Hammer is raised by a stiff
bell or board passing up between two friction rolls, and
is so well known that we will only describe our improve-
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BENNETT HOTCHKISS (who in an interference case with
Goulding and Cheney was declared the first inventor)
and N. C. STILES. Our improvements consist:First.—Of an arrangement of parts that makes it the
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to a great extent, of all other kinds for forging. In ad-
dition to the upright rod, which is operated by the ham-
mer to open and close the rolls, we place another rod
the lower end of which is secured to the end of a lever
which is operated by the hand or foot, which operation
also opens and closes the rolls at will. The lower end of
this rod has a slot, so that the action of the hammer will
not disturb the hand lever, thereby preventing the hand
being injured, as otherwise would be the case.Second.—So the dog is used on the upright to hold up the
hammer. The belt or board passes up between two
clamps situated under the rolls, so arranged that as the
hammer ascends they will freely open of themselves, but
on descending they will close and hold up the hammer.
To let the hammer fall the clamps are opened by pres-
sure upon the foot treadle.Third.—The board or belt is secured to the hammer by
an elastic connection, which prevents the sudden jar and
destruction of the same. The back roll is made adjust-
able to different thicknesses of board or belt, as also are
the clamps. An adjustable collar on the upright rod al-
lows the operator to obtain any height of blow desired
automatically. If one blow is wanted, press upon the
treadle and remove the pressure as soon as the blow is
given. Keep the foot upon the treadle and the blow will
be repeated until the pressure is removed. If a
blow of less height than the collar is set for is required,
work the hand lever, which will give you any height of
blow desired. The hammer can be held up at any point
below the collar by bringing the hand lever into action
when the hammer is at the desired height, so that the
next blow can be given from a state of rest, or less high
than the collar is set for. This is a feature no other drop
has; that is the first blow struck can be of less height
than the second or third, and obtained from a state of
rest. A gentle pressure upon the treadle will allow the
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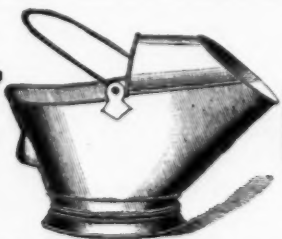
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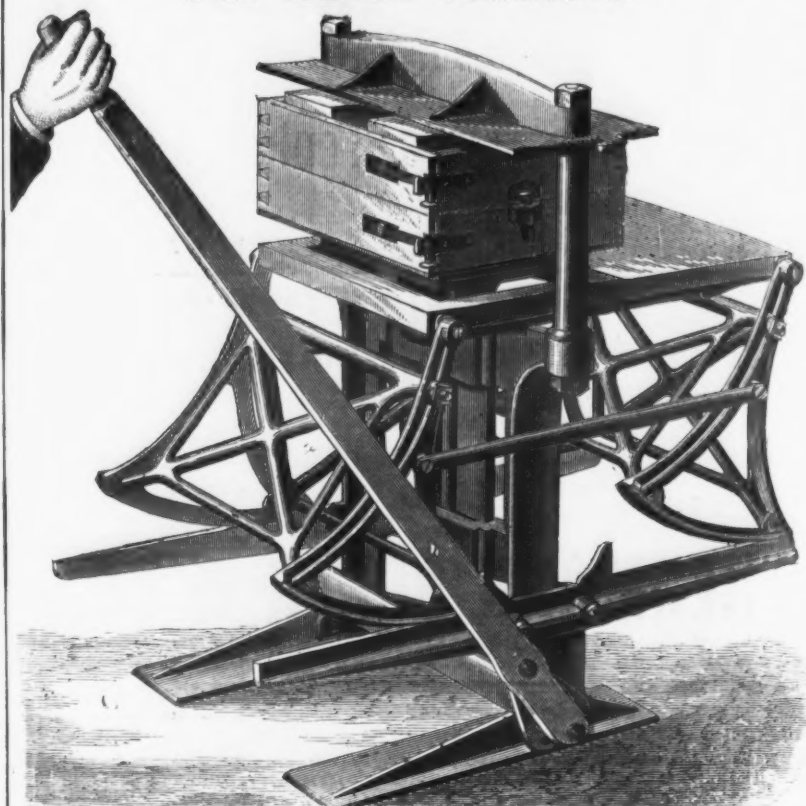
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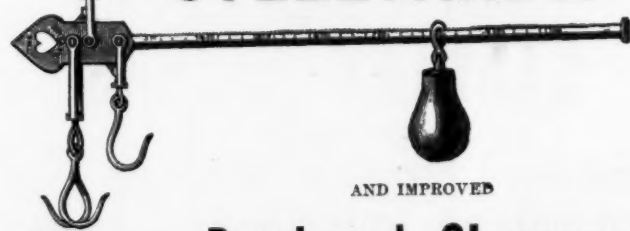
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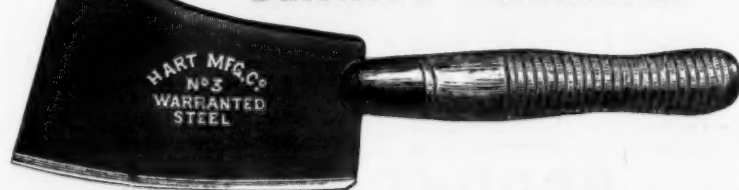
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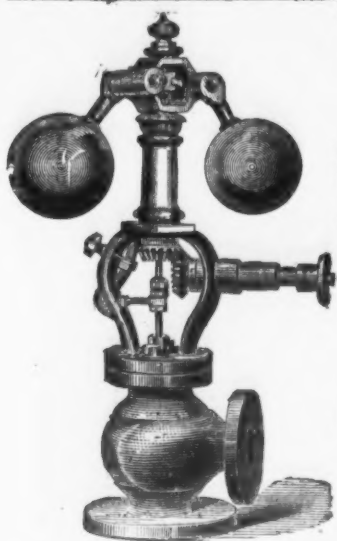
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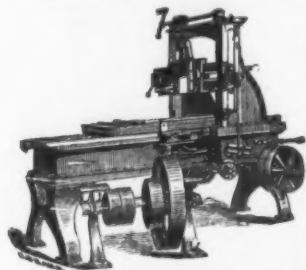
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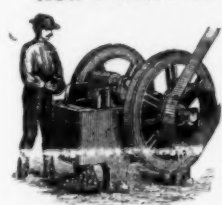
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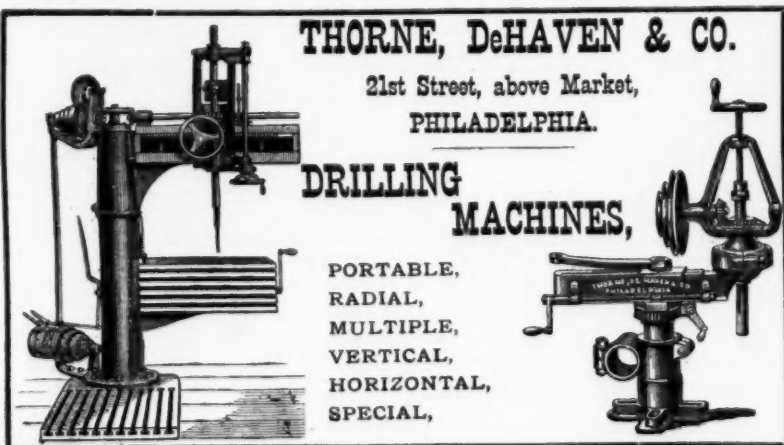
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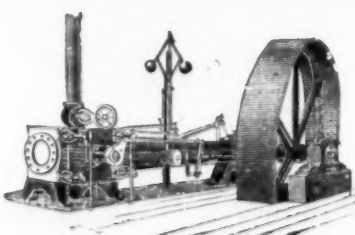
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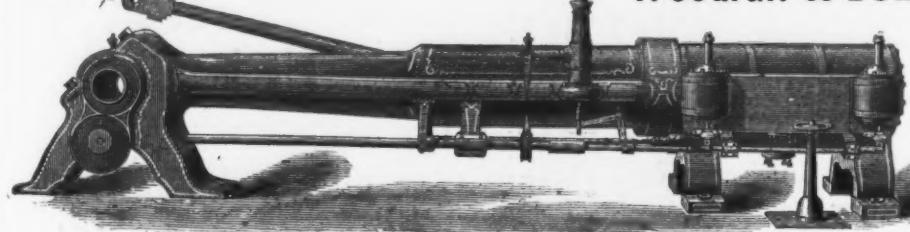
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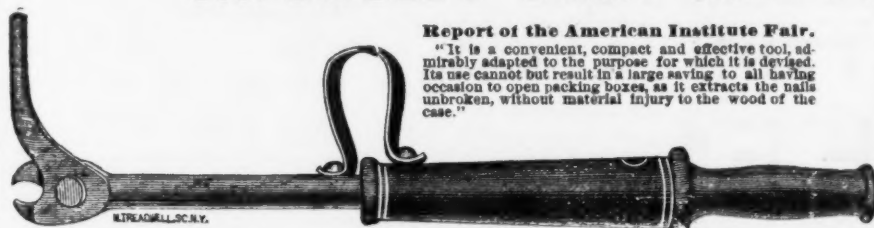
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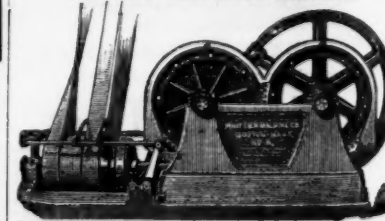


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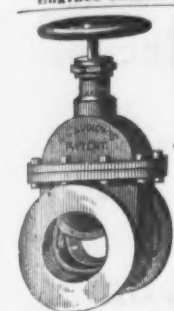
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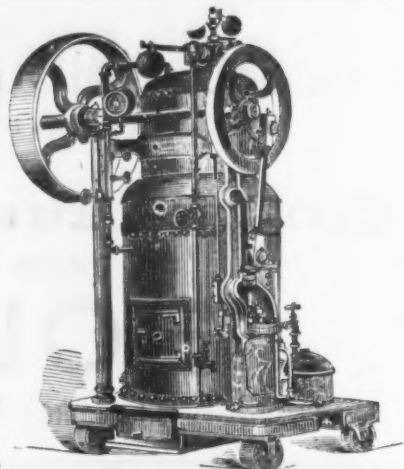
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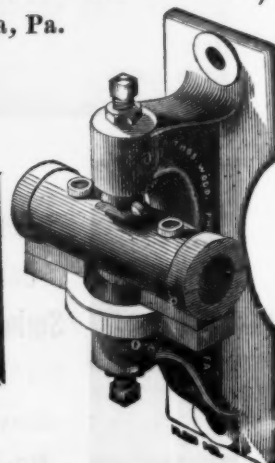
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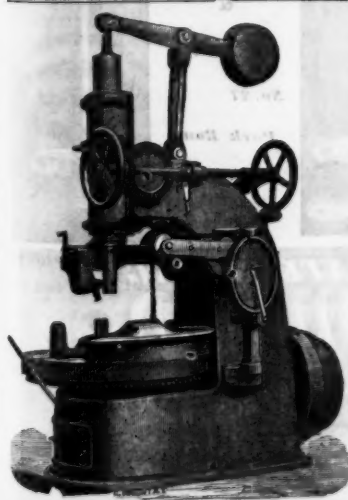


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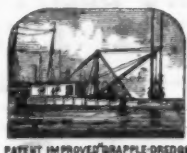
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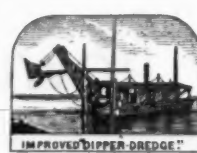
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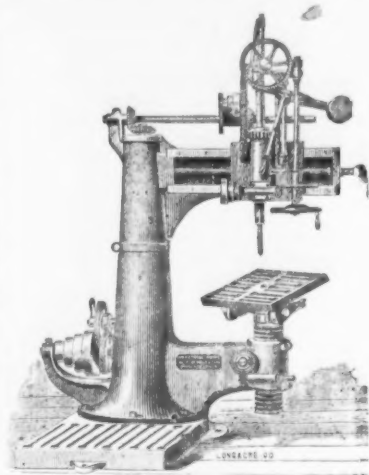
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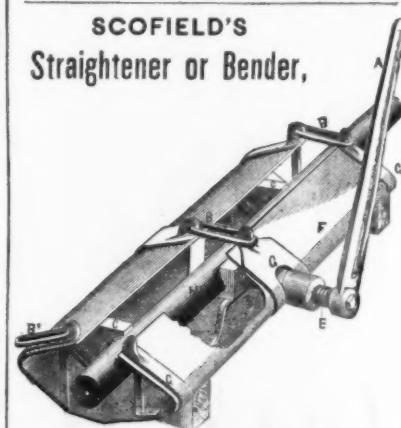
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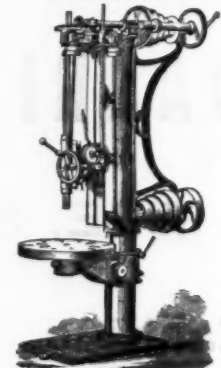
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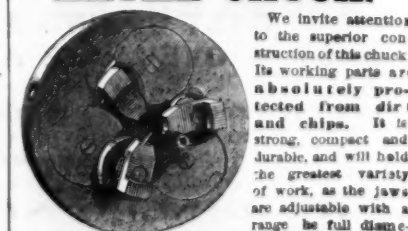
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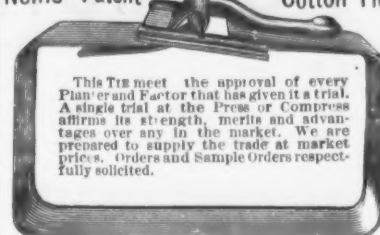
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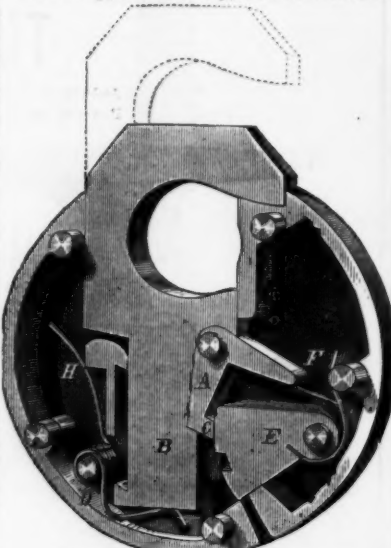
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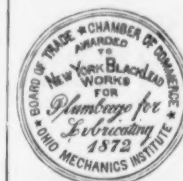
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